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Five Indispensable Assets of the Veterinary Profession

AS INTERPRETED BY "CORN STATES"

1 RELIABLE SERVICE OF SUPPLY—The graduate veterinarian, thanks to the planned organization of the firms who serve him, is able at all times to obtain precisely the materials he needs, quickly and with assurance of quality.

2 IMPROVED PUBLIC RELATIONS—Now as never before the public seems ready to accept veterinary science as an institution vital to national welfare, as a distinct branch of science existent to improve human and animal health.

3 PROGRESSIVE RESEARCH—No better-defined indication of the scope of veterinary research can be found than that in the program of the Washington session of the AVMA, wherein is seen, for the Section on Research, 16 papers covering that many new experimental projects.

4 EFFICIENT DIRECTION—That the federal service, the state and local units, the veterinary educational system, and the national, state and local associations which guard and protect all of these varied undertakings have grown to their present high status is not a case of unguided development; it is unmistakable evidence of sound cooperative direction.

5 COMPETENT PERSONNEL—No matter how richly endowed the foregoing assets may be, they would have little significance without a competent personnel as their foundation. Veterinary science may well be proud of the men it has attracted to its ranks; their individual efforts constitute the unique "personality" of the profession.

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The Veterinary Profession of North America Looks Ahead*

CASSIUS WAY, D.V.M.

President, American Veterinary Medical Association

IT IS THRILLING and inspiring to me to have the privilege of greeting such a large and representative gathering of our profession. Over a period of 33 years I have found that being in attendance at the annual conventions of the Association is a memorable occasion. It offers the opportunity to meet old friends and to make new ones. I am happy to welcome you and I trust that you will thoroughly enjoy the unusual and unique pleasure of convening in the capital city of the United States.

There is much evidence to show that these annual conventions of our association are increasing in importance. Today veterinarians throughout the country realize that the AVMA is their association and that its future is in their hands. Ours is a democratic organization, where the majority rules. And here at our conventions every member has the opportunity to play his part in shaping the destiny of our profession. It is with the deepest sincerity that I urge every member present to participate in the deliberations to the fullest extent.

The history of our association, its struggle for advancement, its accomplishments and its ideals are ably recorded in our archives and records. Most of you are bet-

ter acquainted with these facts than I. For these reasons it is unnecessary to review the past and, therefore, I have chosen as the subject of this discussion "The Veterinary Profession of North America Looks Ahead."

As I prepared this address I was more cognizant of the honor bestowed upon me when I thought of the illustrious men who preceded me in this office. No remarks that I might make upon this occasion would be complete if I failed to mention the ideals of the men who founded this association and the professional principles that inspired its conception—all of which have contributed immeasurably to the success and advancement of the profession.

VETERINARY RESPONSIBILITY IN WARTIME STRESSED

These are troubled times—both nationally and internationally. Here in Washington the visitor can sense the seriousness of the present hour as soon as he steps from the train. Our national government is keyed to a high tension which indicates that the United States is once more preparing to play an adult rôle in the world. There can be no question, whether we like it or not, that the conditions in Europe and in Asia affect us greatly. We can no longer be safe in an attitude of ostrich-like "splendid isolation." We must erase from our minds the idea that the Atlantic and Pacific

*Address of the President, delivered at the 77th annual meeting of the Association, Washington, D. C., August 26-30, 1940.

oceans are protective boundaries. They are not boundaries, they are highways over which any enemy can travel unless we are able to stop him. America must be prepared to face the responsibilities ahead. To my mind, Walter Lippmann has admirably stated the new position of our country in the following paragraph, which I quote:

What Rome was to the ancient world, what Great Britain has been to the modern world, America is to be to the world of tomorrow. We might wish it otherwise. I do. Every man who was young in the easier America of the pre-war world must long for it at times. But our personal preferences count for little in the great movements of history. When the destiny of a nation is revealed to it there is no choice but to accept that destiny and to make ready in order to be equal to it.

As members of a profession which carries a heavy burden of responsibility for the public health of the nation, we too must be equal to our destiny. In the past we have always stood ready to meet crises, and I am confident we will do so now and in the future.

If war should come, it will be the duty of veterinarians in increased measure to protect the food supply of the nation. Food is precious in wartime and we must make doubly certain that animal diseases interrupt our supplies to the minimum. Fortunately, we have a well-organized veterinary service for the control of disease among horses and mules used for transport and combat. We have ample facilities for the production of sera, vaccines and prophylactic biological products with which to help keep our animals healthy. Most important of all, we have a group of professional men who are ready and willing to make the personal sacrifices necessary to serve our country.

It is needless to say that if war comes we want no "embalmed beef" scandals and no decayed food for our armed forces. But I am confident that we can cope with the problems that may be presented. In this connection it is gratifying to note that the Veterinary Corps of the United States Army is being enlarged concurrently with the expansion of the military service. The

Veterinary Corps is an invaluable branch of the service which performs vital functions in peace as well as in war. I am certain that our members will give their fullest cooperation to this expansion program.

When the great European and far-eastern conflicts are ended—and they will end some day—the veterinary profession of those devastated countries will look to the Americas for help and guidance in the rehabilitation of a service that has done so much for the animal kingdom and mankind. The agricultural industry of those unfortunate countries will look to the Americas for foundation blood stock to rehabilitate their herds and their flocks. The "die is cast"; our destiny is revealed. There is no choice but to accept that destiny and make ready for the new order of things that the future holds in store.

PRACTITIONERS' INTEREST IN ASSOCIATION GROWING, BUT GREATER PARTICIPATION IS URGED

I have emphasized that the AVMA is a democratic organization. It is completely responsive to the wishes and interests of the majority of its membership. During the past year the executive officers of your association have endeavored to stimulate among practitioners the desire to take a more active part in the organization. Apparently we have been successful. At the present time 60 to 70 per cent of our members are practitioners. The Association, therefore, is primarily a practitioners' organization. This fact should be reflected in the membership of the House of Representatives and the executive body. Logically, a majority of the members of each group should be practitioners.

The speaker has often advocated that a majority of the state associations should send their best-informed, most successful practitioner to the convention as delegate to the House of Representatives and pay his expenses. For a good many years the tendency among the rank and file has been to "let George do it," and then to sit back, find fault and criticize what "George" did. This attitude has resulted in the development of dissatisfied groups in various

localities. These groups may or may not have organized, but they have at least banded together in an endeavor to correct from the outside faults and conditions, which in reality are imaginary, on the inside. It would seem that this is not the proper way to arrive at a satisfactory solution to this problem. In a large, democratic organization such as ours that has lived, thrived and developed into the greatest organization of veterinarians in the world, on a continent where the principles of democracy still exist (thank God) among a free-living and free-thinking people, the principle of free speech still exists and unity of purpose is better for the profession than divided endeavor.

To paraphrase James Bryce's famous speech, "When good men go to the polls, etc."—when all branches of the profession do their proportionate share and assume their proportionate responsibilities in their national association, there will be no question about the success, the usefulness or the future of this organization. The practitioners of the profession have attained their success through the assistance and guidance they have received from those engaged in the fields of education and research, regulatory and public health service and the production of pharmaceutical and biological products. Speaking as a representative of that group, I think it is fortunate for us as practitioners that we have an organization such as the AVMA in which these three other important elements of our profession are willing to cooperate with us so freely. The educators and research workers, the regulatory and public health men and the producers of biological products—by working with us—make our meetings interesting, instructive, educational and profitable. They help us immeasurably to be successful in our daily work and to be useful to society and to the animal kingdom which we serve. And so I say that the practitioners should become active within the Association we already have and work toward its common good.

WOMEN'S AUXILIARY PRAISED

There is another group to which every member of the Association owes a debt of

gratitude. It is the Women's Auxiliary. Every married man present knows full well that while the ladies are frequently our severest critics, they are also usually our best "window-dressing." Doubtless, marrying a hard-working veterinarian often lacks the glamor they had expected in their girlhood; they have, however, been loyal supporters in our endeavors.

The Women's Auxiliary is doing fine work. The wife of every veterinarian should be a member because through this affiliation she can help a worthwhile cause. Undoubtedly you all know that the Auxiliary administers a revolving fund from which loans are made to senior students in accredited veterinary colleges. Dozens of students have been helped to complete their education through this fund. Furthermore, the Auxiliary serves as a medium through which the public may be informed regarding the profession. We could ask for no better public representatives or public relations ambassadors than the ladies who belong to the Auxiliary. I am sure that much of the enhanced prestige which the Association enjoys today is due to their "talking up" the services performed by the profession.

The Auxiliary encourages its members to participate in public health projects in their own communities. It is legally incorporated and organized and I understand it actually has a substantial bank balance. (In times of "repression" like these it might not be a bad idea to keep on the right side of the treasurer.) And so I welcome the ladies of the Auxiliary most cordially. No annual meeting of our association would be complete without them.

EDUCATIONAL SET-UP EVALUATED

And now I feel that it is my duty to report to you on the "state of the nation" in regard to the veterinary profession. First and foremost is education. I think we can all agree that steady progress toward higher educational standards has been made. In 1920 at Columbus, after a bitter controversy, the Association approved a recommendation of the Committee on Intelligence and Education for four years of

high school training as a preliminary to entrance in all approved veterinary schools. For some time since then, one year of college work or pre-medical training has been a requirement for entrance to all approved veterinary colleges. This year the University of Pennsylvania is requiring two years of college work preliminary to entrance. Doubtless other schools will take the same step.

I have said the following several times during the past year, but I think it will bear repeating here—we will not reach the goal of having the most nearly perfect veterinary educational standards until all veterinary colleges require a seven-year course for a college degree either in agriculture, science or arts and a professional or doctorate degree. Seven years is not too long to spend in learning to become a veterinarian. If the graduates of our veterinary schools are to be capable of carrying on the scientific achievements of today, and of the future, they will need thorough training. The establishment of such high standards for education would surely constitute progress which could not help but be reflected in the future scientific standing of the veterinary profession.

Then there is the question of internship. Many veterinarians today are asking for assistants with more practical experience. They want a system of internship established. If this is done it would seem that it will have to be done at the regular veterinary educational institutions. We have no set-up comparable with that of human medicine, in which graduates are required to devote two years as interns. It is my conception of a well-rounded veterinary curriculum that clinical training shall receive consideration not only in the field of surgery, medicine and hospitalization of animals but also in increased ambulatory clinic service. It seems to me that clinical training is somewhat behind that in the fundamental subjects in some of our schools. This might be corrected by adding another year to the curriculum. However, the physical equipment, the personnel of the teaching staff and other extension of facilities to take care of these increased

demands would be necessary. A precedent for such changes is found, however, in the present tendency in medical schools to expand clinical teaching.

The improvement in the educational standards of veterinary medicine during the past ten years has done more to enhance the respect of the public for the profession than anything that has happened for many years. I think that it is by now quite generally known that veterinary schools have rigid curricular standards and that only well-prepared, intelligent persons have any chance of obtaining admission to our approved schools. All of the approved veterinary schools in the United States have more applicants for admission than they can accommodate and thus they are in the highly favorable position of being able to choose their students, instead of being forced to accept those who come to them. This means, of course, that the profession is assured of a supply of replacements of high academic quality.

There are some in the profession who contend that too many good candidates are being turned away at a time when there is an acute shortage of veterinarians. They believe that the present schools should expand so as to accommodate more students and that it would be well if several more schools could be established. The latter of the two suggestions seems the more practical. Material expansion of existing schools is out of the question if we are to expect them to give thorough training. At least half of the present schools have more students now than they can train properly, especially in clinical work. In my opinion, if time indicates that more graduates are actually needed, the best solution would be the formation of one or two more schools. These schools should not be started, however, by states that are unable, or unwilling, to give them proper support. The two great states of California and Illinois, populous and wealthy in live stock and other materials, could very well maintain and operate schools that would be a credit to those states and to the veterinary profession.

However, is there really a shortage of veterinarians? I know it is true that there

are many areas where veterinary service of good quality is not available but, under our fee system of practice, many of these areas will not support veterinary service. It is true also that the federal government is having difficulty in obtaining enough veterinarians for its service, but this is because of the low rate of compensation and slow advancement. When the government finds that it is possible to offer better inducements to veterinarians and more in line with those offered to specialists in animal husbandry, genetics, bacteriology, chemistry, economics and similar fields, in which no more time or intelligence is required to qualify than in veterinary medicine, I think it will be able to supply its needs.

Even if there is a shortage now, it may not be of long duration. Veterinary schools have been operating at capacity for only the past six years. Only two capacity classes have been graduated. It is, therefore, too soon to feel the full impact of these larger numbers of recruits. According to the careful studies of the Bemis committee, made some years ago, we are now graduating more veterinarians than will be needed to replace those who are dropping out of the ranks through death and other natural causes. In other words, if we go along as we are at present, the profession will rapidly increase in number and eliminate the shortage.

Because there is an over-supply of veterinary candidates, the temptation exists for private interests and low-grade existing institutions to enter the field of veterinary education. The American Veterinary Medical Association should do all within its power to discourage such attempts. We must not drift back to the era of the commercialized school. The education which the modern world requires of any professional man can not be given without subsidy from large endowment funds or from governmental units. Those who attempt otherwise can operate only low-grade schools whose output is bound to be unsatisfactory. The only thing that will discourage such attempts is the raising of the licensing requirements in the various states.

At present many of the states will admit

to their examinations any who are graduates of "recognized" veterinary schools. Now the word "recognized" means nothing unless it is qualified by stating by whom such recognition is given. Charters for low-grade schools can be obtained in many of our states and, this being the case, these schools are "recognized." State associations should be encouraged by the national association to seek amendments of their practice laws, when the present laws are vague, adding to them the provision that the schools must be recognized by the AVMA. The Committee on Education of this association can be depended upon to keep abreast of developments and report its findings to the membership so that recognition can be given when merited and withheld when it is not merited. The time to seek such amendments is now. After schools have been formed it is much more difficult to legislate them out of existence than it is to prevent their organization in the beginning.

I spoke a moment ago about the need for raising the licensing requirements in the various states. This also applies to the licensing of schools of instruction. There is an urgent reason for doing this. At the present time many of our states are being invaded by an itinerant "school" the head of which claims to teach the fundamentals of veterinary anatomy, physiology, pathology and the diseases of the reproductive organs of animals in five days. After that period the men who attend this school are declared to be ready to treat the diseases of reproduction in valuable animals, despite the fact that many of them have had no fundamental preliminary training. We all know that there are no diseases in which the old slogan—an ounce of prevention is worth a pound of cure—is more applicable than the reproductive diseases of horses and cows. The very fact that this school is allowed to give its so-called "course of instruction" in many of our states is a travesty on our system of veterinary education. I can not urge too strongly that every state in the Union should review its educational licensing requirements with a view to banning such schools. The initia-

tive for this effort will have to come from the state associations, which today are constituents of this great association. Here is a need for definite, immediate action. It should not be delayed.

FINAL STEPS IN REORGANIZATION PROGRAM EXPLAINED

There are a few other perplexing problems confronting the Association to each of which I should like to refer briefly.

The reorganizing committee, authorized and appointed at Omaha, consisting of Jakeman, Brumley and Bergman, worked long and faithfully in an endeavor to work out a better organization set-up. They accomplished much. They endeavored to effect a division of responsibility that would avoid one-man control. They recommended a three-man Board of Governors, consisting of the president, the president-elect and the chairman of the Executive Board, who would act as an administrative head in the interim between annual and semiannual meetings of the Executive Board. This recommendation was approved and made legally operative at Memphis. Executive and administrative officers are subject to the direction of the Board of Governors, which also constitutes the Committee on JOURNAL. It is a workable arrangement. In the event of death or incapacitation of any of the executive officers, there is a responsible group with knowledge to administer the business of the Association.

In order to put into operation the reorganized program, a revision of the constitution and by-laws seemed imperative as the old instrument was not entirely applicable to the new set-up. Accordingly, the House of Representatives at Memphis authorized the rewriting and publication of such a revision to be acted upon at this convention. During the year the executive officers and the legislative branches of the Association, as well as various state societies, have spent much time in considering these proposed changes. It is hoped that at this convention a suitable instrument may be developed that may meet the re-

quirements from an administration standpoint and also meet the approval of a majority of the membership.

SUPPLEMENT TO OFFICIAL JOURNAL NEEDED FOR RESEARCH ARTICLES

I am sure there is no need for me to tell you of the many splendid changes that have been made in our official journal. It has been entirely revamped to meet the wishes and demands of the membership at large. The very fact that it is reported that 95 per cent of the JOURNALS are removed from the envelopes and are taken home for reading is a healthy sign.

We have been happy to note also that other leading scientific journals in the veterinary field are expanding their scope of usefulness. The various veterinary house organs are a material aid in supplying practical and useful information to the profession. However, as my immediate predecessor stated in his admirable address a year ago, "the saturation point in this type of veterinary literature is close to being reached."

As far as the JOURNAL is concerned, it would seem that something will have to be done very soon to accommodate the large number of scientific articles which are being submitted for publication. We are happy that the membership is submitting so many valuable contributions to veterinary literature for publication, but I am certain that the editor has often wished there were more room for them. Perhaps the time has arrived when we should consider the publication, possibly four times a year, of additional issues to take care of these scientific papers. If this procedure proved to be practical, these might be increased to monthly issues. Thus we would have a practitioner's issue of the JOURNAL, containing articles of special interest to the average practitioner, news items, advertisements and other subjects of current interest, together with a supplementary scientific number. All this, of course, is dependent upon revenue to finance the project. It would seem that this is but one of the many

good reasons for the proposed increase in dues.

INCREASED MEMBERSHIP CONSIDERED IN TERMS OF OPERATING COSTS

It certainly is a pleasure to be able to report that membership is steadily increasing. In fact, it is slightly over 6,200, which is higher than it ever has been in the history of the Association. This total represents an increase of approximately 1,200 over a year ago. It also is gratifying to note that slightly over 90 per cent of this year's graduates from our veterinary colleges have made application for membership, as compared with 67 per cent a year ago. We heartily welcome these recent graduates into the Association's ranks.

With this increase in membership comes increased opportunities and increased responsibilities. This brings me to the unpleasant but highly important subject of our budget. The membership is getting more in service than it pays for and it is obvious that such reverse economics can not continue without drawing on our capital reserves.

There is another matter which I must discuss here. This year your president has exceeded the amount set aside for traveling expenses. This has happened solely as a result of two factors: first, the incumbent's desire to be of maximum service to the Association and to miss no opportunity to tell the story of the work that is being done for the veterinary profession, and, second, the urgent request from two localities to be present at meetings that were important professional functions. One of these trips was authorized by the Executive Board and the other by the Board of Governors. In the future, one of two things should be considered. Either the decision should be made that the president be quite definitely limited in his travels or there should be an increased appropriation for this missionary work. To my mind, the request and necessity for wide travel by the president is an indication of added interest of the membership in their national organization.

The committees on Bang's disease, rabies, dog foods, poultry diseases, parasitology, and others will present instructive reports

at this meeting, some of them containing important recommendations as to items of policy. It is hoped that the result of your deliberations may be fundamentally sound for the best interests of the membership as a whole, for the public and animal owners whom we serve and for the great animal industry which, after all, makes possible our existence as veterinarians.

RABIES

At Memphis, the House of Representatives unanimously adopted a policy concerning rabies containing substantially the following points:

1) The control and eradication of the disease is primarily the problem and the function of the veterinary profession.

2) The disease is national in scope. Its eradication and control should be under the supervision of some national veterinary-controlled body, preferably the BAI, co-operating with the practitioners of the profession.

3) With proper authority and under suitable regulation the profession could and would eradicate the disease. It has been eradicated from other countries and it could be eradicated from this country.

4) Although rabies vaccination is undoubtedly of considerable value in building up resistance in animals to natural infection, the Association should go on record as favoring the control and eradication of the disease by regulatory methods, which involves the control of all dogs.

That statement of policy was endorsed by many veterinarians in the field of small animal practice, the American Kennel Club, by many dog writers, owners of dogs, and regulatory and public health officials. The Committee on Rabies of the USLSSA recommended a policy which was almost identical at the last meeting of that association. At the Colorado state veterinary conference in February of this year, William H. Feldman of The Mayo Foundation endorsed the policy. Virtually everyone believes that the disease could and should be eradicated, yet virtually everyone seems reluctant to tackle the job.

At the meeting in Memphis, certain mem-

bers who have rather extreme ideas on the subject demanded that the Association refute the statement made by writers on subjects pertaining to dogs that the profession was guilty of racketeering. The Executive Board took the stand that those statements were untrue and without foundation and, therefore, were not worthy of consideration.

What does the disease cost the profession each year? No accurate figure is available, of course, but it certainly is many thousands of dollars. Every rabies scare results in the destruction of many dogs and the elimination of their owners as potential clients of the local veterinarians. Many of you may be familiar with what happened recently in a large eastern city when the public was asked, during a rabies scare, to destroy all dogs. In one day, following that appeal, it is reported that 600 dogs were killed. If this destruction had continued at the same rate, all of the dogs in the city would have been killed within a few weeks. It is obvious that the small animal practitioners in that city would have lost their source of income.

On the other hand, if the fear of rabies could be eliminated, it is a conservative statement by well-informed small animal specialists that thousands of homes would add a canine member. Just imagine what that would mean to small animal practitioners! In view of these facts, I subscribe that some official national agency in organized veterinary service that is qualified by education, training and experience to cope with the problems incident to the control and eradication of contagious diseases of animals, especially those transmissible to man, should be charged with the responsibility of supervising, organizing and directing the forces within the profession that are capable of eradicating the disease.

In a country that boasts of having the finest institutions of education and research in the world; that has within its borders the largest and best organization of veterinarians in the world; that has developed the most efficient regulatory service—national, state and municipal—for the protection of human and animal health in the world; where the profession has eradicated

such diseases as contagious pleuropneumonia, dourine, foot-and-mouth disease, glanders and others; where it has controlled and practically eradicated bovine tuberculosis and Texas fever; where it is making great progress in the control of Bang's disease, bovine mastitis, equine encephalomyelitis, hog cholera, scabies, parasitism and other diseases too numerous to mention; where the profession boasts of being the most advanced in the practice of the art of veterinary medicine, it is a sad commentary on efficiency, it is humiliating, that this country should stand second only to Turkey in the prevalence of such a dreaded disease as rabies.

Such an intolerable condition should not be allowed to continue. We must eradicate rabies and we must do it efficiently. When it comes to offering a remedy, I am reminded of one of the leading Thoroughbred breeders of Kentucky who had a large sign in a prominent place which listed ten or twelve fundamental rules governing the operation of his farm. One of these fundamentals was, "No complaint will be entertained unless accompanied by a remedy." And so I wish to present four items of a remedy for the present rabies situation which at least offer a basis for discussion:

- 1) We should have a national law giving the dog a status equal to that of other live stock.

- 2) The control and eradication of all animal diseases is fundamentally the problem and function of the veterinary profession.

- 3) A national government agency, preferably the Bureau of Animal Industry—for it is the only national agency capable of doing the job—should in cooperation with approved and accredited veterinary practitioners in this country be charged with correlating a cooperative federal-state plan for the control of the disease. (We have been temporizing with the rabies problem in this country with the present set-up since the latter part of the 18th century. I think the exact date is 1768.)

- 4) There should be uniform state laws, capable of enforcement, designed for: a) the humane destruction of all stray and ownerless dogs; b) the licensing, identification, establishment of ownership and con-

trol of all other dogs until the disease is eradicated (with the proper enforcement and the coöperation of dog owners the goal could be attained within a few years); c) compulsory notification by owners as well as veterinarians of any cases of the disease (suspects to be effectively quarantined and destroyed as soon as positive diagnosis is made); d) a six-month quarantine for all dogs brought into the country; and e) promoting an intensive educational program among all factors of society—professional, regulatory, dog owners, dog writers, and the public at large—regarding the care of dogs with reference to the spread of rabies.

A recent and interesting statement from a writer of popular articles about dogs is most apropos. I quote:

If the United States is to lose the dubious distinction of having next to the highest score in the prevalence of rabies, there will have to be in all states enactment of uniform legislation designed to eradicate the disease and, likewise, uniform vigilance in carrying out such measures.

The state veterinary medical society in one state, where the control of rabies is about as effective as in any state in the Union and where methods employed for the control of the disease are quite similar to those outlined in the policy adopted at Memphis, has passed a resolution disapproving the principle of having the Bureau of Animal Industry as the federal agency to supervise and coördinate a rabies-eradication program. In view of results obtained in countries where national supervision and control have been effective, if it is desirable from the standpoint of being beneficial to the profession as a whole to eradicate the disease, it would seem that such resolutions are at least inconsistent with well-established principles in the control of other infectious diseases of animals in this country.

History may be repeating itself. When the campaign for the eradication of bovine tuberculosis was inaugurated under federal and state supervision, many individuals and groups of practitioners voiced strenuous opposition on the ground that the rights, privileges and prerogatives of the practitioner were being usurped. What actually happened? Soon accredited practitioners

were being put into the service, additional work was being provided in almost every state, and—now that the job is completed—the work of retesting and maintaining accreditation is in the hands of the accredited practitioners of the various states and is carried on under federal and state supervision: a rather happy solution of the problem, which has resulted in the eradication of the disease and increased work for the practitioners. It is hoped by many that some comparable solution of the rabies question may ultimately prevail.

When all is said and done, until those of the profession who are engaged in research are able to furnish the man in the field with a more efficient prophylactic agent for the control of rabies, any program for the eradication of the disease that does not take into consideration that most vital factor, the "perambulating pup," better known as the stray dog, will be about as successful as the nationwide attempt to produce the "abundant life" by vaccinating "Uncle Sam" with the alphabet.

Until that time, therefore, would it not be better for the policy on rabies of the Association to read about as follows:

While there is disagreement among eminently qualified scientists as to the immunizing value of rabies vaccine, the AVMA recommends to the public that compulsory, annual vaccination should not be relied upon for the solution of the rabies problem. The Association recommends that this disease can be checked and eliminated by instituting and enforcing measures to insure that all dogs shall be kept under control and the ownerless stray eliminated.

In maintaining a policy which encourages public confidence in any prophylactic product which is imperfect, the Association can not very well escape a share of moral responsibility for failures, which may lead to human deaths, even though that percentage of failures may be very small. It is the veterinarian himself upon whom the client and the public rely and upon whom will fall repercussions when false confidence leads to inexcusable and humiliating results. The public at large is certain to accept the judgment of impartial and world-recognized authorities in the field of research whose work in solving other prob-

lems in epidemiology has earned a unique confidence.

Because the veterinary profession has accomplished such creditable results in controlling other animal diseases it is to be hoped that as the true story of rabies vaccination, eradication and control is unfolded in scientific journals devoted to immunology and preventive medicine, and reaches the public through popular articles containing reliable information in dog magazines, household periodicals and conservative newspapers, that the profession may be prepared to institute a program of eradication that may be 100 per cent effective.

THE DOG-FOOD-TESTING PROGRAM

Last year at Memphis a resolution was adopted by the House of Representatives pledging the Association's coöperation with the American Animal Hospital Association in an attempt to help solve some of the undesirable conditions existing in the dog-food industry. Considerable controversy over the dog-food-testing program has developed during recent months. Statements which are misleading, to say the least, have appeared.

It has been said by some that the program is a meaningless project, that it is without authority, that it should be reviewed and revamped, that it is worthless because the large manufacturers do not support it. Now, in contrast to these views it is the opinion of many veterinarians that the program is not a meaningless gesture, that it is "on the level" and is definitely worth while. It is true that the large manufacturers have not generally supported the program, but this fact certainly does not prove that the program is worthless. On the contrary, we can feel proud of the high quality of manufacturers who have come to the Committee on Foods to have their products tested.

It has been rumored that the Committee on Foods has received thousands of dollars from the sale of seals for which the members can not account. These are false rumors, unfair propaganda and unjust insinuations. First, seals are not sold; they

are awarded to manufacturers whose products have been submitted, tested and found to meet requirements. Second, only five manufacturers have submitted their products.

The total cost to each manufacturer is approximately \$950, of which \$500 is to cover the expense of the test, purchase of the samples, shipping, etc. The other \$450 was collectively agreed upon by the manufacturers to cover the cost of supervision, promotion, publicity, etc. At present this amounts to the "enormous" total of \$4,750 a year. Third, all the accounts of the Committee on Foods of the AAHA are audited by a certified public accountant. Bills are paid on the triplicate voucher system signed by the president, the treasurer and the chairman of the Committee on Foods.

The seal of approval has a definite and clear meaning. It means that the food in the container bearing the seal is wholesome, nutritious and adequate for the maintenance of weight, growth and reproduction when fed in proper amounts according to the size, temperament and activity of the normal dog. It means that the contents of the container are as represented on the label. It means that the food has passed rigid chemical and biological tests. It means that no fantastic claims are made in advertising and that the whole program is under the supervision of competent veterinarians and eminent scientific authorities in the field of nutrition.

There is no reason that the seal of approval can not come to be recognized by the public as comparable with the stamp "Inspected and Passed by the B.A.I." on carcasses of meat or the seal of approval on a bottle of certified milk or "Accepted—A.M.A. Committee on Foods" as that seal appears on foods tested and approved by the American Medical Association.

The dog-food-testing program, as at present carried on by the AAHA, with the AVMA coöperating, is definitely a worthy project. There is no valid reason that manufacturers of quality foods should not accept it and profit by it. Too much conscientious, self-sacrificing effort has been put into it by men who have worked solely for "the good

of the cause" for the program to fail. Most important of all, there is much evidence to show that dog owners are beginning to look for the seal of approval on the containers they buy. We are gaining public goodwill and should be able to maintain it. Coöperation, education of the public, publicity and the wholehearted support of the profession as a whole will make the program a success.

PROFESSION WARNED TO GUARD AGAINST STATE MEDICINE

The trend toward state medicine within the veterinary profession has become marked during recent years. We should be on our guard against it. Throughout the country there has been considerable criticism from practitioners of the fact that some of our veterinary institutions perform services for livestock breeders in wide areas either free or at very low cost. I am confident that no one in the field of practice objects to free or low-cost ambulatory clinic service within a reasonable radius of any veterinary college, but in these days of easy and quick motor transport the radius is becoming entirely too great.

I submit that such state medicine is directly contrary to the ideals of the pioneers of the profession, such as Law, Liautard, McEachran and Moore. The practitioner spends from five to ten years in technical training. He has a large investment in physical equipment. It would seem that he has quite definite priority rights when it comes to the practice of veterinary medicine, and when the state is allowed to take over this function, it is an infringement upon the rights of an established group of citizens. The practitioners and their clients support the state institutions as taxpayers. When a state institution gives free, or low-cost, medical treatment to the animals of private citizens, the taxpayers pay for it.

Another example of a highly undesirable condition is the Iowa State Serum Buying Agency, a subsidiary corporation of the Iowa State Farm Bureau Federation. This agency is a glaring example of the triumph of purely mercenary interests over common sense in the control of animal plagues. The agency offers 25,000 memberships at \$1.00

each to holders of farmer vaccination permits and the plan is to place stocks of anti-hog-cholera serum, virus and other biological and sundry products in a central location in each county. The agency expects to sell 10 million cc. of serum, 125,000 cc. of virus and approximately 45,000 doses of other biological products the first year. This means that the farm bureau is virtually doing a retail business in competition with private business and practicing veterinarians. It is a hazardous arrangement for the farmer and unjust competition for the veterinarian.

Another plan which is extremely detrimental to the practitioner is one which has been evolved by some agricultural extension workers who plan to organize farmers into an association to deal collectively for veterinary service. This sort of collective bargaining puts professional men on the basis of laborers. It destroys initiative and it is unjust.

I contend that neither federal agencies nor educational institutions, either agricultural or veterinary, should enter into competition with private practitioners. Coöperation, consultation and advisory activities are quite all right, but not competition. They should be bound not to give free service or service at rates which practicing veterinarians could not duplicate and stay out of bankruptcy. "State medicine" of this kind is definitely harmful to the best interests of the profession.

Similarly, the manufacturers of veterinary biological products and pharmaceuticals have maintained a consultation service which is beneficial to the practitioner. But, unfortunately, the service frequently does not end at the consultation stage. After specific cases have been investigated, owners of animals have called the consultant and had treatment recommended and administered. All such service should be handled through the practitioner.

In one state in the Central West, there is a growing trend among the practitioners to sell veterinary supplies to their farm clients. They have taken this action in an effort to keep the veterinary products business in professional hands, where it belongs.

The products they sell are primarily serums, bacterins and poultry antiseptics and, although the profits derived are not great, some practitioners believe that the supplying of veterinary products is a business that rightfully belongs to them. Rather than see the sales fall to drug stores, county agents and lay supply firms, they are content with keeping this branch of veterinary service in their own hands at least.

There is another problem which to my mind requires immediate attention. The American Farm Bureau Federation should define its scope of activity clearly and specifically. I say this because the veterinary profession must look to its self-protection against other agencies whose activities may infringe upon the rights of private practitioners, unless they are kept within the proper and legitimate channels.

POULTRY

During the past year definite progress has been made, I think, in putting the service of the veterinary profession to the poultry industry on a par with the service performed in other branches of animal industry. However, there is much still to be accomplished. The situation still presents a challenge which we can not treat lightly. If the general practitioner does not help to control and prevent the diseases which threaten the poultry industry, then we shall see more and more "quackery." The poultryman needs and deserves help and will accept it from either the nearest or most reliable source available. The veterinarian is often overlooked. Furthermore, many farmers believe that veterinarians are not interested in poultry diseases or are incapable of furnishing intelligent service. We know that this is not true, but it is up to us to prove our interest in the poultry field. During recent years much progress along this line has been made.

The Section on Poultry has a splendid program prepared and the clinic promises to be one of the best that ever has been held. Much credit for this should go to the splendid work of the special Committee on Poultry Diseases under the leadership

of its energetic chairman. The report of this committee should be one of the highlights of the convention.

ARTIFICIAL INSEMINATION

Scientific artificial insemination, used for the improvement of breeds of live stock, has become an established procedure in the practice of veterinary medicine. The educational department of the State of New York has ruled that this work definitely falls within the realm of veterinary practice. For obvious reasons this work should be supervised by a veterinarian trained in the diagnosis and treatment of the breeding diseases of animals. Under these conditions many unfavorable and undesirable results can be prevented. It is gratifying to have reports from all over the country concerning the success of well-regulated efforts in this field of practice. Undoubtedly it will have a marked effect on the improvement of various breeds of live stock.

If this procedure is so highly successful in the cattle industry, it would seem that it might be doubly successful in the horse industry. The speaker would like to recommend that artificial insemination be used to improve the breed of Thoroughbred horses. It is a practice that is fraught with tremendous possibilities. When a syndicate of breeders pays \$250,000 for the Thoroughbred stallion Imp. Blenheim II, why should his potential usefulness be restricted to 40 mares each year? What might have happened to the Thoroughbred industry during the past 20 years if Man O' War, Black Toney, Gallant Fox and Sun Briar had produced 500 foals each year instead of 35 or 40?

If artificial insemination were to be adopted for Thoroughbreds, it would: 1) improve the breed of horses because the best sires would be used; 2) decrease breeding diseases in horses because a skilled veterinarian would examine each mare before insemination; and 3) permit castration of 75 per cent of male Thoroughbreds as soon as they have been tried sufficiently, thus eliminating many stallions undesirable for breeding.

This is one of the best methods for "im-

proving the breed" of horses if breed organizations are sincere in their efforts to do so.

WORK OF LOCAL COMMITTEE LAUDED

I am sure that the year just completed will go down in history as being anything but dull. There are, of course, misgivings on the part of your executive officers, but I am certain that I am correct in the statement that they have all been sincere in their endeavors. When the ledger is balanced, the membership will have an opportunity to evaluate the result and determine whether the account is in the red or the black.

This convention should be a memorable one. Not since 1891 has our association met in the national capital. We come here this year with many major problems to be solved; and I know that wisdom will prevail to solve them well.

This convention will be memorable also from the standpoint of the work done by the Committee on Local Arrangements. John R. Mohler and his coworkers have planned a complete, interesting and entertaining program. We all owe a sincere vote of thanks to the men and women of this committee who have labored so earnestly and so hard in our behalf.

I wish at this time also to thank the entire organization for the coöperation it has extended to me during the past year. The committees have done their utmost to advance the interests of the Association and their work has resulted in much progress.

The honor of being president of this association is one I shall cherish as long as I live. The organization has a glorious past, but it has an even more glorious future. I am deeply proud to have been chosen to help, to the best of my limited ability, in working out its destiny. The veterinary profession of America will continue to move forward.

The Vitamin Famine

IN THE FEEDING of man and animals it is becoming more and more evident that chronic deficiency troubles are an ever-increasing menace. As a speaker* declared

at the New York meeting (1940) of the American Medical Association, "War may be causing famine in Europe, but here in the United States, even without war, there is a chronic famine. . . . People are starving for lack of vitamins and minerals."

Foods as they come to the table have been deprived of much of the protective substances they originally contained. Wheat flour is deprived of 90 per cent of its B₁ and practically all of its E factor in the process of milling. Water-soluble vitamins are washed from the soil to such an extent that herbivorous animals and man who lives on their products do not consume an amount of vitamins and minerals sufficient to keep in a state of normal health.

In 1938, says *Science News Letter* (June 22, 1940), the American people spent \$100,000,000 for vitamin preparations, and physicians in 1937 prescribed \$26,000,000. These figures, for the human population alone, show that the depletion of vitamins and minerals in the food we eat is a stern reality, and that the prevention and treatment of disorders and clinical diseases rank among the important medical problems of this moment. In fact, as the problem looms in animal medicine we are living in the midst of famine.

The Ladies at Local Meetings

THE CUSTOM of bringing the ladies to meetings of local associations is growing. Several associations provide entertainment for the ladies while the members are in session. Card or other games and theater parties are the types of distractions in vogue. As a rule, the assemblage disbands after a midnight lunch. More and more local veterinary societies are finding this plan of developing interest in the profession an excellent one.

The Chicago Veterinary Medical Association several years ago started that method of getting the wives of members interested in the society, and a letter from Dr. Horning of the Houston (Texas) association speaks of the founding of a similar program. Everywhere the activities of ladies' auxiliaries are increasing, according to information received.

*Tom D. Spies, Birmingham, Ala.

The Control of the Chronic Form of Streptococcic Mastitis*

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A NUMBER of papers have appeared concerning the bacteriological detection and the control of the contagious form of mastitis caused by *Streptococcus agalactiae*.¹⁻⁸ Special consideration should be given to a few of the more important and practical points of view expressed by these workers, namely: a) that mastitis caused by *S. agalactiae* is a strictly contagious disease^{1,2}; b) that *S. agalactiae* is an obligatory parasite and under natural conditions the habitat is the udder and its secretion^{1,3,4}; c) that the disease can be detected by the bacteriological examination of the secretion from individual cows and controlled by the disposal or segregation of the infected animals¹⁻⁸; d) that efficient hygienic measures should be carried out during milking to prevent the spread of infection from cow to cow^{1,2,3}; e) that it is advisable to make replacements in these herds from home-grown heifers free of infection^{1,2,6}; and f) that in certain instances udder infusion with some suitable medication is helpful in the eradication of the infection of mild cases.^{1,2,4,8,9} It would appear, therefore, that the chronic form of mastitis caused by *S. agalactiae* is a contagious disease which can be detected and controlled by bacteriological methods ap-

plied to the milk of individual cows with the disposal or segregation of the infected animals.

Minett¹⁰ questions, however, "whether the view is generally correct, that by a series of cultural examinations applied to the milk of individual cows it is possible to eradicate the disease relatively easily or quickly." This is an important point because it is upon the accurate detection of chronic mastitis that the early elimination of the infected animals depends. As an illustration, he discussed the view already expressed by Steck that in mildly infected cows there may exist a "cultural latency" for as long as six months. In other words, Steck believes that the failure to reveal the presence of streptococci in the secretion of these animals was due to the small amount of fore milk cultured, since apparently 0.5 cc. or 1 cc. was not adequate. Recent observations suggested to Minett that in some herds infection with *S. agalactiae* in first-calf heifers was higher than formerly considered, possibly as the result of calfhood infection.

The object of the present paper is to report the bacteriological detection and control of the chronic form of bovine mastitis caused by streptococci belonging to mastitis-streptococcus group I (*S. agalactiae*).¹¹

MATERIAL

The four herds concerned in this study are designated as A, B, C and D. Herd D has been under observation for nine years and the other three herds for over three years. Herds A, B and C were chosen for this study because conditions in each were favorable for coöperative supervision and the number of cows in the individual herds was small enough for a

*From the Department of Animal and Plant Pathology, The Rockefeller Institute for Medical Research.

¹Minett, F. C., Stableforth, A. W., and Edwards, S. J.: J. Comp. Path. & Therap., xvi (1933), p. 131.

²Stableforth, A. W., Edwards, S. J., and Minett, F. C.: J. Comp. Path. & Therap., xlviii (1935), p. 300.

³Plastringe, W. N.: Proc. 3rd Int. Cong. for Microbiol., 1939 (1940), p. 664.

⁴Schalm, O. W.: Certified Milk, xv (1940), p. 11.

⁵Plastringe, W. N., Anderson, E. O., White, G. C., and Rettger, L. F.: Storrs Agr. Exp. Sta. Bul. 197 (1934).

⁶Plastringe, W. N., Anderson, E. O., Weirether, F. J., and Johnson, R. E.: J. Dairy Sci., xix (1936), p. 641.

⁷Hucker, G. J., and Harrison, E. S.: New York Agr. Exp. Sta. Tech. Bul. 246 (1937).

⁸Steck, W.: Schweiz. Arch. Tierheilk., lxxx (1938), pp. 181 and 250.

⁹Steck, W.: Tilgung des gelben Galtes. Bern & Leipzig: Verlag Paul Haupt. (1939).

¹⁰Minett, F. C.: J. Comp. Path. & Therap., iii (1939), p. 266.

¹¹Minett, F. C.: Proc. 12th Int. Vet. Cong., ii (1934), p. 511.

monthly or at least a frequent bacteriological examination of the milk.

METHODS

In herds A, B and C the cows were kept under exceptionally good conditions. The stable routine was carefully supervised and before milking the udders were cleansed with a dampened sterile cloth and then dried with another. The udder cloths were laundered daily and in herds A and B they were soaked in a chlorine solution before being used. All cows were hand-milked and the attendants washed their hands in warm soapy water before milking each cow.

When a bacteriological examination of the milk was made, the preliminary laboratory work was conducted at the respective farms. The routine methods employed have already been reported in detail.^{12,13,14} The samples of the fore milk (3 or 4 cc., none discarded) upon collection were kept chilled and 1 cc. of a 1:10 dilution was plated in blood agar. The leucocyte films also were prepared on the premises and the chloride dilutions set up.

In herd A the fore milk from each separate quarter of individual cows was examined bacteriologically at least once a month. In herds B and C during the first six months the milk was examined as in herd A, but during the next seven months the examinations were conducted irregularly.

As herds B and C increased in size it seemed feasible from a practical standpoint to develop simpler cultural methods and occasionally check them by a complete laboratory examination of the milk, as was conducted in these herds at the beginning of the study. Since May 1938, this has been done, and the tests have been made on a monthly basis. In many instances the milk from all the cows was examined by the Hotis test¹⁵ (9.5 cc. of milk, 0.5 cc. of a 0.5 per cent sterile aqueous solution of brom-cresol purple), or else one half of the herd was tested bac-

teriologically and the other half by the Hotis test. If the half-and-half procedure was used, on the next visit the milk of cows previously tested bacteriologically was studied by the Hotis method, and *vice versa*. Previously on the preliminary herd examinations the Hotis test was used with satisfactory results to detect the infected animals quickly for immediate segregation until a bacteriological examination of the secretion from separate quarters of individual cows could be completed.

With the development of *S. agalactiae* in the incubated samples (Hotis test), the color in the tubes changes from blue or purple to a yellow shade due to the production of acid from lactose, the growth appearing as small yellow balls along the sides or as a yellow deposit in the bottom of the tube. Although streptococci belonging to mastitis-streptococcus group II (*S. dysgalactiae*) or group III (*S. uberis*) and atypical forms may fail to produce the same color changes in the milk as *S. agalactiae*, the presence of these organisms could be ascertained. In positive or suspicious reactions the streptococci may develop as white or bluish specks along the sides of the tubes or a faint yellowish deposit may accumulate in the bottom. Since staphylococci and other microorganisms may produce similar reactions, the milk from positive or suspicious samples was filmed and when streptococci were present the milk was streaked over the surface of a blood-agar plate.

Following Edwards' report on the use of the liquid medium (to 1,000 cc. of meat-extract broth, add 5 Gm. of glucose, 1 cc. of 0.1 per cent crystal violet and 0.1 Gm. of sodium azide),¹⁶ the test he recommended was applied to milk of individual cows in herds B and C, to a large extent substituting for the more difficult laboratory tests. A mixture of equal amounts of sodium azide (1:500 solution) and brom-cresol purple (0.1 per cent solution*) was added to samples of milk, 0.5 cc. to 9.5 cc. of milk from single quarters, and 1 cc. to

¹²Little, R. B.: Cornell Vet., xxviii (1938), p. 23.

¹³Little, R. B.: Cornell Vet., xxix (1939), p. 100.

¹⁴Little, R. B.: J.A.V.M.A., xlvii (1939), p. 496.

¹⁵Hotis, R. P., and Miller, W. T.: U. S. Dept. Agr. Circ. 400 (1936).

*Changed by the author to a 0.5 per cent solution.

¹⁶Edwards, S. J.: J. Comp. Path. & Therap., ii (1938), p. 250.

19 cc. of composite samples. The milk was then incubated for 24 hours, as was customary when only the latter dye was used for the detection of streptococci. Usually a 1:10 dilution of the milk was immediately plated in blood agar or occasionally in Edwards' aesculin agar. After the samples had been incubated for approximately 16 hours, 0.01 cc. of gravity cream was inoculated into Edwards' broth. Following incubation for 24 hours *S. agalactiae* developed as a flocculent deposit in the liquid medium.

In herds A, B and D, besides the regular monthly examination, occasionally samples from each separate quarter were tested in the following manner: a) 9.5 cc. of fore milk was collected in tubes containing sodium azide and brom-cresol purple and incubated for 48 hours; b) following collection of the fore milk, a composite sample was obtained consisting of approximately 25 cc. of the next milk and a like amount of strippings and incubated for 24 hours; c) after 16 hours of incubation, cream from all samples was inoculated into Edwards' broth, and after 18 to 24 hours of incubation, milk from the composite samples or portions of the liquid medium were streaked on the surface of blood-agar plates.

In many instances between the scheduled tests, milk showing some abnormality or milk from cows soon after parturition was brought to the laboratory for examination. If such milk had not been examined in intervals between the monthly visits to the farm, at the next regular visit it was tested by separate quarters, not only by routine methods but also by extra tests.

The milk from cows in herd D was examined bacteriologically as described for herd A.

To classify the streptococci culturally, surface colonies were transferred to blood-agar slants for later identification. For the fermentation tests the carbohydrates were added aseptically without subsequent heating of the medium. The tubes before inoculation were incubated to insure sterility, and the indicators were Andrade's or brom-cresol purple. Unless the strepto-

cocci were recovered from poured agar plates, the hemolysis was determined and 0.1 cc. of a broth culture inoculated into dextrose, lactose, saccharose, salicin, mannite, inulin, raffinose, sorbitol, trehalose, sodium hippurate, litmus milk and methylene blue milk in various dilutions. The serological classification of many cultures was determined by preparing the extracts according to the method of Lancefield¹⁷ or Brown.¹⁸ Precipitin tests were made in small tubes of 3-mm. diameter by layering the extract in the desired dilutions over small quantities of antiserum.

HISTORY OF HERD A

Herd A was a small self-contained group of Guernsey, Holstein-Friesian, and Ayrshire cross, varying in numbers between 16 and 19 milking animals. The original examination of the milk (16 cows) was made on April 29, 1936, when composite samples drawn into tubes containing brom-cresol purple were incubated for 24 hours. Streptococci were identified in the secretion of seven cows. A bacteriological examination of the milk from separate quarters of each cow was made on May 5, and streptococci were detected in the secretion of 16 quarters of the seven animals. Culturally they belong to mastitis-streptococcus group I (*S. agalactiae*) and serologically to Lancefield's group B. They were beta hemolytic in blood agar with the development of the narrow zone of hemolysis. Following the second laboratory examination of the milk, the seven infected cows were immediately removed from the herd. Since then the milk from each quarter of each cow has been examined monthly by methods already described. The herd is now composed of 17 milking animals, and 21 first-calf heifers have been received from young stock. A number of these young cows are in their fourth lactations.

RESULTS IN HERD A

Since May 1936, *S. agalactiae* has not been cultivated from the secretion of a cow by any of the tests applied to the

¹⁷Lancefield, R. C.: Proc. Soc. Exp. Biol. & Med., xxxviii (1938), p. 473.

¹⁸Brown, J. H.: J.A.M.A., cxi (1938), p. 310.

milk. Severe, mild or transient infections in seven cases were caused by *S. uberis*, while in five animals similar infections were attributed to atypical streptococci.¹⁴ The presence of staphylococci in the milk of certain cows, other than producing slightly higher determinations by the indirect tests or mild changes in the character of the secretory tissue, was of little consequence.

Two infections were caused by *Escherichia coli*, one of which was of such severity that the animal was destroyed. The mastitis in the other cow was less acute and the bacteria disappeared from the secretion of the affected quarter within three days.

At parturition *S. uberis* was cultivated from the secretion of a single quarter of a first-calf heifer and an atypical streptococcus from the quarter of another.

Following the disposal of the seven cows originally found infected with *S. agalactiae*, 13 others were eliminated from the herd from time to time for other reasons: two because of mastitis caused by *S. uberis*, and one by *E. coli*; one because two quarters were harboring *Staphylococcus aureus*; four because of low production; one on account of sterility; two as the result of mummified fetuses; one because of injury; and one on account of a foreign body. At present the total average yearly milk production per cow is as high as it was before the seven high-yielding infected animals were eliminated. The bacteria count of the bottled milk when 1 cc. of a 1:10 dilution of it is plated in blood agar usually is under 500 bacteria per cubic centimeter.

When the experiment was terminated after four years, only two cows in the herd, an aged individual and a second-pregnancy cow, were shedding streptococci in the milk. *S. uberis* was present in the secretion from the left fore quarter and an atypical strain persisted in the right fore quarter of the aged cow, while *S. uberis* was cultivated from the secretion of a quarter of the second animal in which the closing mechanism of the teat had been injured.

HISTORY OF HERD B

Herd B was a self-contained Holstein-Friesian herd of 33 milking cows. On March 19, 1937, composite samples of milk from each cow were drawn into tubes containing brom-cresol purple and incubated for 24 hours. Streptococci were identified in the secretion of 16 cows. A bacteriological examination of the milk from separate quarters conducted ten days later showed that 32 quarters of the 16 cows were infected. The streptococci cultivated from the secretion of 15 cows were beta hemolytic and produced either the double or the narrow zone of hemolysis. Culturally they belonged to mastitis-streptococcus group I (*S. agalactiae*) and serologically to group B. One additional infection was attributed to *S. uberis*. The 16 infected cows were immediately placed in a separate barn and cared for by individuals who were not in contact with the normal cattle. Both groups of cattle had access to separate paddocks but were together while on pasture. The last infected cow was disposed of in December 1938. The herd now consists of 45 milking cows, while 40 heifers have been admitted from young stock. In September 1938, one pregnant heifer and three first-calf cows were introduced from an outside herd.

RESULTS IN HERD B

Following the original examinations, infections developed four months later in two of the negative cows. *S. agalactiae* was cultivated from the secretion of the right hind quarter of one cow on July 1, 1937, and again five days later. Other determinations, such as the pH, percentage of chlorides and leucocyte count, were normal. At the next monthly test in August, the streptococci had disappeared from the secretion and were not detected again during the period the cow remained in the herd. It seems likely that the organisms were confined to the duct of the teat and failed to become established in the udder. The other cow developed an infection in two quarters following an injury to the teat.

Since the appearance of these two in-

fections, *S. agalactiae* has not been detected in the secretion from the udder of any cow except a first-calf heifer at parturition. In this case three quarters were affected.

Fifteen persistent infections were caused by *S. uberis*, and two by *S. dysgalactiae*; one of the latter was very acute, the organisms later being replaced by *S. uberis*. In addition, *S. uberis* was identified on one occasion from the udders of five cows. Atypical streptococci were associated with four chronic infections and in five instances were cultivated from the secretion of separate quarters on a single examination. Staphylococci were responsible for mild infections as indicated by indirect tests and the presence of mild udder fibrosis, especially in cows in which the count exceeded 8,000 to 10,000 colonies per cubic centimeter of milk. Streptococcal infections attributed to group III organisms, although usually not as destructive in the udder as *S. agalactiae*, in this herd were cause for considerable concern. When the bacteriological study of the milk was begun, *S. uberis* was identified only in a single quarter of one cow and she was segregated with the infected animals, yet new infections continually appeared in the normal cows.

One heifer at parturition showed a severely atrophied quarter, and *Corynebacterium pyogenes* was cultivated from the scanty secretion. Another young cow calved with the two fore quarters severely atrophied, with nearly a complete absence of secretion, possibly the result of calf-hood suckling.

Since March 1937, 23 infected cows have been eliminated from the herd (*S. agalactiae*, 18; *S. uberis*, 5); five animals have been disposed of on account of a low production and one as a result of abortion, while three have died.

This herd is one of 13 herds under the same management. In August 1939, it led this group in production and since then it has been among the seven high-yielding herds.

HISTORY OF HERD C

Herd C was a self-contained herd of 43 Holstein-Friesians. On April 14, 1937, composite samples of milk were drawn into tubes containing brom-cresol purple and incubated for 24 hours. A bacteriological examination was made of the secretion from separate quarters on April 19 and 28, and *S. agalactiae* was cultured from the secretion of 59 quarters of 24 cows. Both the narrow and double-zone beta hemolytic streptococci were isolated, belonging culturally to mastitis-streptococcus group I and serologically to group B. The infected cows were segregated at one end of the stable away from the negative cows and were milked last. Both groups were together in the paddock and on pasture. The laboratory examinations of the milk were conducted as in herd B.

During the past three years 30 home-grown heifers have been admitted from young stock. This herd now numbers 36 milking animals. Four of the original uninfected animals are still in the herd, besides eleven of the mastitis cows.

RESULTS IN HERD C

It was impossible to control the spread of the chronic form of mastitis caused by *S. agalactiae* when the infected cows were maintained in the same stable with the uninfected animals.

Following the first bacteriological examination of the milk, four cases appeared in 1937, two in 1938, two in 1939 and four in 1940. Three of the last four cases were caused by nonhemolytic streptococci of group I. This was the first appearance of this form in the milk from any cow. Early in 1939, five cows with mild chronic infections were obtained from another farm under the same management and were placed with the infected cows. These animals have not been included in the data pertaining to herd C and their milk was not carefully studied. The nonhemolytic streptococci of group I may have been introduced in the secretion of some one of these animals. Moreover, after the original survey the group segregated because of infection with *S. agalactiae* was not tested for nearly two years; therefore, it

is possible that some cows also may have had mild nonhemolytic infections which were not recognized on the preliminary tests. A chronic streptococcal infection in two quarters of one cow was caused by *S. dysgalactiae*, and this organism was also present in the secretion of a quarter of a young cow.

S. uberis and atypical forms of streptococci were encountered much less frequently than in herds A and B. Nevertheless, mild staphylococcal infections were as prevalent as in herd B.

Mastitis with atrophy of a quarter was encountered in one heifer and *C. pyogenes* was isolated in pure culture. In another first-calf cow a mild mastitis was caused by *E. coli*.

A *Trichomonas* infection necessitated the prolonged milking of certain cows and the disposal of 22 animals because of abortion and sterility. Thus, the appearance of this infection in the herd may have been a contributing factor in the failure to reduce the spread of streptococcal infections more successfully by quarantine methods.

HISTORY OF HERD D

Herd D was assembled in 1930 at the department of animal pathology of The Rockefeller Institute for Medical Research in order to have normal cattle available for experimental purposes. Young calves (grade Holstein, Guernsey and Jersey) born at a nearby farm, none of which had suckled its dam, were immediately taken to the Institute and fed 1,200 cc. (2.5 pt.) of normal cow serum in place of colostrum for protection against infection with *E. coli*. These animals were raised on whole milk and completely segregated from other cattle.

In 1931, when the nine heifers and a bull were about 6 months old, they were turned out in a paddock under natural conditions, with no restriction as to breeding. At parturition each cow was confined in a shed for about a week, and the quarters that were not suckled by her calf were then milked out once daily to eliminate the colostrum. The reason for milking them at this time was that after certain quarters began to secrete milk, the calves would no

longer suckle the quarters still containing the colostrum fluid. When the cows were released the calves suckled for at least six months, and at no time were the dams again confined unless injured or indisposed.

The herd now consists of approximately 30 to 35 animals, of which 20 are breeding cows, including five of the original group of females. These animals have never been fed grain or silage. In the warmer months they have sufficient pasture for maintenance, but during the winter they are fed a good grade of alfalfa hay and occasionally mangels.

RESULTS IN HERD D

After the young animals started to calve, milk samples from each one were occasionally subjected to a complete laboratory examination. Since early in 1938, at the fifth or sixth day of confinement the milk from each quarter of each cow has been examined bacteriologically before she has been placed with the other animals. In no instance during a period of nine years has *S. agalactiae* been identified in any sample of milk examined. Occasionally *S. uberis* and *Staph. aureus* have been cultivated from the milk.

DISCUSSION

The results of this study show that the chronic form of mastitis caused by *S. agalactiae* can be detected and thereby controlled by frequent bacteriological examinations of the secretion from individual cows. In three herds, besides the elimination or quarantine of the infected animals, strict hygienic measures were carried out in stable management and replacements were made primarily from home-grown heifers. In one herd the infected cows were immediately disposed of, in another they were placed in a separate stable, and in the third they were maintained in the same barn with the normal animals.

It would appear that in order to eradicate the disease quickly in a herd, the infected cows should be immediately disposed of or segregated in a separate unit. In the herd where they were maintained with

the normal cows, new infections appeared during the period the herd was under observation.

Herd D is of particular interest since during a period of nearly ten years five of the original cows are still in the herd, and they have given birth to 45 calves. *S. agalactiae* was never identified in the milk of any cow in the herd and other kinds of streptococci have only rarely appeared in the secretion. It would seem that under natural primitive conditions when cows are not exposed to infection by stable confinement under modern dairy conditions or forced to produce a maximum milk yield for ten or more months of each lactation, nature can preserve the usefulness of the udder for the purpose for which it was originally developed. This suggests that the present demands placed on the dairy cow may be conducive to certain physiological changes¹⁰ which render the gland more susceptible to infection.

In the bacteriological examination of the milk from herds A, B and C, *S. agalactiae* has been cultivated from the secretion on only three occasions in which the plating of the fore milk (first 3 or 4 cc.) in blood agar failed to reveal its presence.

It has been questioned¹⁰ whether small samples of milk cultured in 0.5-cc. or 1-cc. amounts with the usual methods are capable of revealing the presence of infection in mild cases of disease. Perhaps the efficiency of the bacteriological methods applied to the milk of these herds was enhanced by the kind of sample collected (first milk drawn), the amount (3 or 4 cc.), the kind of media used,¹² and the fact that the milk was plated in blood agar shortly after it was collected. The practice of discarding the first stream of milk may in some instances eliminate up to 9 cc. or more of fore milk, thereby flushing out the teat and lower portion of the cistern. Thus, in the early or mild infections if the streptococci are confined to these areas many of the organisms may be lost so that even the collection of a larger sample (50 cc.) might fail to reveal their presence.

In the practical routine diagnosis and control of streptococcal mastitis where for economic reasons the bacteriological examination of quarter or composite samples of milk in blood agar is prohibitive, the technic evolved by Edwards¹⁰ should serve a useful purpose in the detection of infection. In this study the effectiveness of the Hotis test was greatly improved by the addition of sodium azide, since, when necessary, samples could be incubated much longer. When the Hotis test is used in addition to Edwards' selective liquid medium, the milk from a large number of cows can be examined frequently by two different methods. The selective medium of Edwards has a further advantage in that extracts may be prepared for the serological classification of the streptococci, especially when abundant growth develops within 24 hours. Hence, when it is not imperative to determine the hemolysis of the streptococci, infections attributed to group A streptococci, *S. agalactiae*, or *S. dysgalactiae*, can be serologically confirmed if these organisms develop in the liquid medium.

In three of the herds, severe and mild cases of mastitis were caused by *S. uberis* and other kinds of streptococci,* of which the former in two herds was frequently identified in the milk. Although these infections on the whole were not very destructive in the udder, they should not be regarded too lightly. Until more is known concerning the natural habitat of streptococci other than *S. agalactiae*, it would appear rather hopeless to anticipate the maintenance of a herd entirely free from these streptococci, which, even if present in the udder in a dormant state, are potentially always capable under the proper conditions of inducing severe infections.

Unfortunately, in the bacteriological study of milk of individual cows, staphylococcal infections have received too little attention, since usually the main objective has been the identification and the classification of streptococci. In the herds here reported the presence of certain udder

¹⁰Little, R. B.: J. Dairy Sci., xxii (1939), p. 689.

*The cultural characters of these streptococci will be described in a later paper.

staphylococci in the fore milk in numbers above 8,000 per cubic centimeter usually resulted in changes in the character of the secretion, associated with a mild fibrosis of the gland. Plastringe *et al*²⁰ found that following the reduction or eradication of *S. agalactiae* infections, udder staphylococci were the chief cause of mastitis in three herds. The hemolytic and plasma-coagulating strains were usually responsible for some evidence of udder irritation, while the nonhemolytic forms were of less significance. They mention that in one herd a severe outbreak of mastitis was caused by staphylococci, and it has been recognized by other workers that occasionally the presence of *Staph. aureus* in the udder may terminate in a severe mastitis, occasionally resulting in the death of the cow.

Although streptococci other than *S. agalactiae*, in addition to staphylococci and other microorganisms, may induce both mild and severe infections with the development of varying degrees of udder fibrosis, usually the milk from herds free of the chronic form of mastitis (*S. agalactiae*) is of a better quality.

Obviously, in the control of the contagious form of mastitis, besides the evacuation of the infected animals it is necessary that replacements to the herd be free of infection. In the self-contained herds this is not a serious problem, for first-calf heifers have been regarded as being relatively free of infection. Recently, however, Minett¹⁰ stated that infection in first-calf heifers may be more extensive than heretofore believed, questioning their absolute freedom from disease and the suitability of all young animals for replacement purposes. As already pointed out in this paper, in only one instance (herd B) was *S. agalactiae* present in the secretion of a first-calf heifer at parturition, although originally the incidence of mastitis in these herds was rather high. On the other hand, *S. uberis* and atypical streptococci occasionally were encountered in the colostrum of heifers and in many cases the organisms

disappeared from the secretion of the affected quarters shortly after the cow was in milk. Likewise in two heifers at parturition a severe form of mastitis was caused by *C. pyogenes*.

It seems quite likely that there are certain factors which may be responsible for the appearance of infection in young animals, and these need further investigation. First, there is the possibility that young cows may become infected in herds where it is the custom to milk the pregnant heifers before calving to relieve the acute congestion of the udder. Second, as parturition approaches, the closing mechanism of the teats of young cows should be carefully observed, for the sphincters are subjected to considerable pressure due to the acute swelling of the gland. At this time they may no longer function as a protective barrier, but provide a possible channel for the entrance of bacteria. Third, since in many instances *S. uberis* and other forms of streptococci are cultivated from the early colostrum fluid but do not persist after the first few weeks of lactation, it should be ascertained whether or not the suckling calf is the vector in their introduction into the udder. Fourth, more information is needed in regard to the possibility that infection occurs in calfhood when they suckle one another, especially in herds where the calves are fed mastitis milk or allowed to nurse infected cows. Fifth, the experiments of Smith and Little^{21,22} concerning the significance of colostrum to the newborn calf should be repeated to determine if *S. agalactiae* present in the colostrum is absorbed with the antibodies and proteins and if *S. agalactiae* can be cultivated from the lymph nodes and internal organs of the newborn calves receiving colostrum teeming with these organisms.

SUMMARY

It has been shown that in two herds the chronic form of mastitis caused by *Streptococcus agalactiae* was detected by bacterio-

²⁰Plastringe, W. N., Anderson, E. O., Williams, L. F. and Weirether, F. J.: Storrs Agr. Exp. Sta. Bul. 231 (1939).

²¹Smith, T., and Little, R. B.: J. Exp. Med., xxxvi (1922), p. 181.

²²Smith, T.: Cornell Vet., xv (1923), p. 173.

logical examination of the secretion from individual cows and controlled by the elimination of all infected animals. One herd has been free from infection for nearly three years and the other for over four years.

In another herd raised under special precautions *S. agalactiae* has never been detected in the secretion of any cow during a period of nine years.

In one herd where the infected animals were maintained in the same stable with the normal cows and milked last, new cases appeared throughout the period of observation.

The results of this study suggest that the contagious form of mastitis can be more quickly eradicated from a herd when the infected animals are immediately disposed of or segregated from the normal cows.

Ten Years of Progress

Successful Farming, a magazine that keeps us aware of what is going on in the business of farming, relates the accomplishments in that realm during the difficult 1930's, which began in a state of industrial collapse. In the list of outstanding developments to be credited to the last ten years, the author* includes:

- a) More effective livestock disease control,
- b) increase of farm productiveness through cross breeding of live stock,
- c) commercial development of hybrid corn,
- d) increase in farm electrification, and
- e) nationwide interest in soil conservation.

Obviously, farming is one of the industries that did not stand still to harangue over political controversies. The reason is equally obvious. Farming, animal production and veterinary medicine, the three-horse hitch furnishing the pulling power of

the nation, have caught the public eye for the first time in American history. The good folks in town have found out where they get things to eat and drink and wear and that the farm is our most precious possession.

The veterinarian's particular part of the program of the past ten years might be broken down into:

- a) The enlargement and refinement of our veterinary educational system,
- b) the fruits of many valuable researches on animal diseases,
- c) the closer supervision of biological and pharmaceutical production and distribution,
- d) the removal of worthless remedies from the channels of trade,
- e) the masterly coöperation between federal and state veterinary services,
- f) the increased influence of organized veterinary medicine, and
- g) the improved technical knowledge of the nation's veterinary personnel obtained through better periodical literature and society work.

All of these achievements are turning the public mind toward work in the veterinary profession, which up to now stands without blemish—work that speaks well for the profession's leadership and ideals, which must continue to be guarded against materialistic projects.

4-H Clubs Foster Desire for More Education

Of the students enrolled in agriculture and home economics at the University of Illinois, 50 per cent are former members of 4-H clubs. In Indiana, Kansas and Nebraska the percentage is 40, and for the whole country, 37 per cent, according to a recent survey made by the federal extension service. The total number of former 4-H club members in the agricultural colleges at this time is 6,934, as compared with but 751 in 1928-1929.

*Meredith, E. T., Jr.: Our outlook for '40. *Successful Farming*, xxxviii, March 1940, p. 24.

Vaccination for Bang's Disease*

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THE DEVASTATING nature of Bang's disease has brought widespread demands for relief from its ravages. There is general agreement among cattle owners, veterinarians, livestock sanitarians and scientific workers that the objective should be the eradication of Bang's disease. Although at the present moment there is general agreement on the objective, there is considerable divergence of opinion on the means by which this objective should be reached. This is not surprising in the light of the many factors and conditions that make up the complex Bang's problem.

The popular interest in the newer form of Brucella vaccination has increased markedly during the past year. Since this has a definite bearing on the official coöperative Bang's eradication program of our nation, it is not possible to discuss Bang's vaccination without presenting it in relation to the parent Bang's eradication program.

Let us for a moment look in retrospect at the past successes against destructive animal diseases, particularly those of our own country. There we find outstanding achievements with lasting values in the total or practical eradication of animal plagues. Contagious pleuropneumonia, foot-and-mouth disease, bovine tuberculosis, tick fever and glanders are prominent examples of results based on a policy having eradication as its goal. One by one these diseases have been subjected to an eradication objective, and one by one they have yielded to the forces of extermination. These accomplishments did not come easily. During the eradication process in some cases drastic methods had to be used against the stubborn diseases; some of the programs were regarded as extremely expensive; and opposition of one sort or another stood in the way of normal progress. In spite of

this, the eradication objective in the case of each of these diseases has been reached. As a consequence, the productive economy of the nation has been improved and our livestock producers are not obliged to pay large annual tolls in the form of losses to these plagues. This was all made possible because in each instance there was a willingness to unite back of a national disease-eradication program which was developed by an unselfish leadership and formulated on both a scientific foundation and a comprehensive understanding of the practical aspect of the problem.

Brucella vaccination is very much under discussion at the present time—discussions which are both serious and sincere. I am sure it is the purpose of all who are genuinely interested in the problem from the standpoint of the herd owner's welfare to enthusiastically welcome the values of Bang's eradication along with the intrinsic value of Brucella vaccination. With this, of course, goes the obligation of protecting the eradication program against unsound treatment and preventing the reckless, irrational and premature use of a vaccinal product.

In order to bring into view both the effects and the potentialities of Brucella vaccination in the eradication picture, it is necessary to refer to the Bang's eradication program which was started on a national basis in 1934. I can do this best by bringing to your attention the progress and accomplishment of Bang's eradication in my own state, with which I am most familiar. Since the Bang's eradication picture in Wisconsin is somewhat comparable with that of the other sections of the country, it will present a sample that is more or less representative of the national picture. In fact, there is not much variation in the accomplishments based on the work done in the various states engaged in Bang's eradication work.

*From the College of Agriculture, University of Wisconsin; presented at the 13th annual Ohio State University conference for veterinarians, June 14, 1940.

As a result of the widespread demand on the part of herd owners in my state, a strictly voluntary Bang's program was commenced in 1928. This program was directed at the eradication of the disease in individual herds. On July 1, 1934, when federal funds were first made available to aid in the eradication of this disease, we had 500 herds on the Bang's accredited list and 3,000 herd units under the Bang's eradication program. This included a relatively

in the full realization that the purpose was to secure badly needed funds to aid in the eradication of these diseases. The agency through which these funds were administered was incidental. It mattered not whether the funds came under an emergency, relief or regular appropriation label.

In a little less than six years since the beginning of federal participation, much progress, as shown by figure 1, has been made both under the voluntary herd plan and the country-area plan. With this progress we have reached the stage where 7 per cent of our 187,000 herds are now regarded as free from Bang's disease, and 26 per cent are regarded as still infected. The distribution of Bang's disease, except in the area-tested counties, is such that the remaining infected herds are interspersed among clean herds; thus they continue to serve as foci of infection and must be considered as a potential hazard. Naturally, the three fourths of the cattle owners of the state who have herds free from the disease have a right to expect protection. Both state and federal governments have an obligation to protect these clean herds. This can best be done by concentration of effort on the infected herd fraction to reduce still further the incidence of infection and thus decrease the hazard.

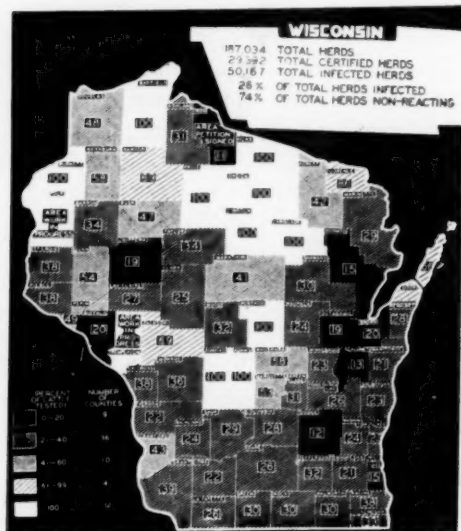


Fig. 1.

high percentage of purebred herds. At that time, Bang's vaccination, as it is before us today, was not in the picture, although we were in the midst of the job of suppressing the unwarranted use of bacterins and the dangerous practice of vaccination with virulent live cultures.

Federal aid, which commenced in 1934, although coming under the guise of emergency funds, nevertheless had a definite motive of Bang's eradication back of it. This same aid was applied to the eradication of bovine tuberculosis, since the terms of the legislation provided for the use of these emergency funds for both bovine tuberculosis and Bang's eradication. Those who contributed most in the way of effort to secure emergency funds to be used for Bang's and tuberculosis eradication did so

That Bang's disease yields readily to the testing and elimination program is exemplified by the rate of reduction in both herd and cattle infection as shown in figure 2. One will note that approximately two thirds of the infected herds were freed from the disease on the basis of one test. The amount of infection remaining after the fourth retest is a relatively small fraction of the original. Though small, this nevertheless is a significant fraction because it contains the group of herds which are frequently referred to as "problem herds." To these I shall refer later.

The reduction in both herd and cattle infection has occurred at a rate which was not expected even by the most enthusiastic proponents of the program at its inception. The lowering of the infection incidence markedly excels that in our tuberculosis experience. This, however, is not a strange

picture, because veterinarians who have had extensive field experience both under the tuberculosis and Bang's programs not infrequently have recognized that it is considerably easier to free herds from Bang's disease under our present program than it was to free herds comparably infected with tuberculosis under the tuberculosis-eradication program.

It was only natural to progress from the individual herd-testing plan into the county-area testing plan. Twelve counties, as noted in figure 1, are enrolled under the area plan. A little over 50 per cent of the herds in both Polk and Trempealeau counties have been tested under the individual herd plan. It is of interest to note the comparison, as far as herd and cattle infection is concerned, as indicated under the individual herd plan and the area plan. Since the individual herd plan has been under increasing operation from the inception of the work in 1934, a considerable number of the herds which were tested under the individual plan have remained for varying periods before again being given attention under the area plan. Note the marked reduction of infection in the area figures. They definitely indicate that the accomplishments under the voluntary herd-testing plan have stood up, and that reinfection of clean herds and herds that have been freed from the disease must have been at a low figure. I think that figure 3 illustrates another point, and that is that the badly infected herds are the ones that first called for attention under the voluntary testing program. A survey of results in other parts of the state indicates the same tendency. This bespeaks the efficiency of the program.

The success against Bang's disease, as shown by these data, speaks more eloquently than I could place into words that the Bang's eradication program now in progress is making rapid strides toward the goal of eradication.

At this point it is appropriate to ask, where would Brucella vaccination fit into this eradication picture? Certainly, there would be no reason to use vaccine on the 74 per cent of the herds that are now free from the disease. The greater portion of

these have never been infected, although they have been in existence since the beginning of cattle raising in our state. In approximately two thirds of the 26 per cent infected fraction, there is no great need to introduce new methods to help in the eradication of the infection because these herds can be freed from the disease on the basis of one test—a very simple method of coping with the disease. That leaves out of a total of 187,000 herds approximately 17,000 infected herds of the more difficult kind.

BANG'S DISEASE TESTS IN WISCONSIN ON 58,135 HERDS
SHOWING REDUCTION IN HERD AND CATTLE INFECTION

	HERDS	INFECTED HERDS	PERCENT INFECTED OF ORIGINAL HERDS TESTED	CATTLE	NUMBER OF REACTORS	PERCENT REACTORS OF ORIGINAL CATTLE TESTED
ORIGINAL TEST	58,135	24,479	47.3	1,053,718	153,247	14.5
1ST RETEST INF. HERDS	27,666	8,005	13.7	530,110	30,580	2.9
2ND RETEST INF. HERDS	21,992	4,844	8.3	448,341	12,269	1.1
3RD RETEST INF. HERDS	16,047	3,011	5.1	352,568	7,767	.7
4TH RETEST INF. HERDS	6,650	1,572	2.7	176,254	5,003	.47
5TH RETEST INF. HERDS	736	270	.46	25,065	778	.073

CONTINUATION OF THE RETESTS ON THE REMAINING INFECTED HERDS INDICATES THE FOLLOWING—

15TH RETEST	35 HERDS INFECTED	52 REACTORS AMONG CATTLE
20TH RETEST	10 HERDS INFECTED	15 REACTORS AMONG CATTLE
25TH RETEST	2 HERDS INFECTED	8 REACTORS AMONG CATTLE
35TH RETEST	1 HERD INFECTED	3 REACTORS AMONG CATTLE

Fig. 2.

A considerable portion of these will classify as "problem herds" because of the greater difficulty they offer to the cleaning-up effort. Such herds are not new in the job of disease eradication.

There is vast experience with "problem herds" infected with tuberculosis. Many tuberculosis-infected herds continued to yield reactors for a decade and more after the initial tests. In fact, experience indicates that the tuberculosis "problem herds" under many circumstances could be handled most economically by complete disposal.

In the case of the Bang's "problem herds," assistance of some sort is needed. Can vaccine be an aid in coping with Bang's "problem herds"? Some think it can, but there certainly is need for research work of an intensive nature, directed specifically at this problem to demonstrate its ability to help in this capacity. In addition, there is need for intensive research on other aspects of the "problem herd" situation. There is a question as to whether frequent retesting

and disposal of reactors is the best that can be offered in the case of "problem herds." It also is recognized that opportunity exists for improvement in the method and technic as they relate to the "problem herd" question. We are confronted with the realization that intensive application of research effort is greatly in need. Through it we have the hope of dealing more effectively with "problem herds" and approaching with more certainty the goal of eradication.

With Bang's disease, as in tuberculosis and other diseases, reinfection occasionally occurs and much is being said about this hazard—so much that there exists an unjustifiable fear among large numbers of our clean-herd owners. Seemingly, a propaganda of fear is being spread. Various agencies, including some of the farm press, aid in the dissemination of the fear psychology. Alarming statements, indicating that owners of Bang's free herds are sitting on a keg of dynamite and that the herds may easily become infected in the case of a small slip, are being spread verbally and through the printed word. Data to substantiate such alarming statements are not in evidence. In fact, the experience is to the contrary.

In looking for an example that vigorously refutes this propaganda of fear, we find it in one of our counties, where 75 per cent of the enrolled herds were infected on the initial test. It can be best illustrated by two brief letters from a practicing veterinarian to the official headquarters. Under date of November 24, 1939, the veterinarian wrote to one of the officials in charge of the Bang's program, as follows:

Am writing to report progress in Bang's disease control work in my county. Most of our breaks in certified herds appear in the winter season due to the common practice of allowing the cattle the freedom of the farm after the crops are harvested, permitting the cattle to mingle with the community cattle through the back fences.

During the summer months, while they are confined to the pastures where the fences are good, little trouble occurs. Beginning on May 1st, 1939, I have tested 52 certified herds for recertification, representing 1,721 head of cattle, and disclosed only one reactor. The reactor was intro-

duced into the herd after the certification test was made. In the same herds, 324 reactors were eliminated on the initial test.

Many certified herd owners test their herds semi-annually, so since May 1st, 1939, I have made 52 herd tests on 1,844 head of certified cattle, with but one reactor.

Under date of January 23, 1940, the same practicing veterinarian wrote to the same official, as follows:

No doubt it will be interesting and heartening to you to know that I have had but one Bang's disease reactor in the last 2,600 head of cattle privately tested for recertification. This run started May 1, 1939, and represents 76 herd tests.

Perhaps I should add that the veterinarian reporting the above experience commands no unusual advantages; in fact, he is located in an area where conditions for reinfection of herds are at their optimum. The experience of this veterinarian shows that with reasonable precautions there is no cause for excitement or fear.

There is concern in some quarters that cattle living in the absence of Bang's infection will in time increase their susceptibility to the disease. This same apprehension was voiced during the earlier stages of tuberculosis eradication. In our state we need only to look at the 53 per cent of our 187,000 herds which during their entire existence were not exposed to the infection. There is no evidence that from an inheritance standpoint they are more susceptible to Bang's infection than cattle in herds where occasional or continued opportunity for exposure to the disease exists. There is not an iota of evidence which suggests that under the usual cattle-breeding procedure there is even a limited opportunity to transfer inherited characters which would lower or increase the animals' susceptibility to Bang's infection. Cattle exposed to the Bang's germ which become infected and remain carriers of the disease throughout their lives can not transmit any acquired properties relating to the disease to their offspring. This is in compliance with the simple principle that acquired characters do not become inherited.

Even during the present period in the

midst of an economy of reasonable plenty, as far as dairy products and dairy cattle are concerned, we hear that the Bang's eradication program removes cattle needed for production and in some cases cattle carrying valuable blood lines. Again, in looking through the records we find that in our state from 1934 to 1939 there were removed 234,446 Bang's reactors. The year during which the highest number of Bang's reactors was removed was 1936, and in spite of the fact that these diseased cattle were removed and, in addition, the normal export trade in dairy cattle was carried on, the cattle population of Wisconsin during that year increased by 2 per cent. The raising of one additional heifer on only 25 per cent of the farms of our state would have taken care of the replacements necessitated by the removal of diseased cattle during any year when the program was in full progress. Just why any serious problem should exist in connection with removing cattle carrying valuable blood lines is not clear, because the high majority of the purebred herds are free from the disease. Many purebred herd owners took the initiative to eradicate the disease before the beginning of the present official Bang's program.

There is one point which is of particular interest to the dairy sections of this country. It has a bearing on the economics of dairy products and should not be passed over without consideration. For 15 to 20 years prior to 1934, by virtue of eliminations made under the tuberculosis-eradication program, a steady stream of diseased cattle was being removed each month from the herds of our country. Expansion in the production of cattle came into being to provide replacements, and a pace of cattle production has been established. With the successful progress of the tuberculosis-eradication program, fewer and fewer reactors were being removed as the incidence of infection decreased. The removal of tuberculous cattle was reaching a low point at about the time that the federal Bang's eradication program was commenced in 1934. With the beginning of this program and the consequent elimination of Bang's

diseased cattle, a significant economic gap was bridged. Without the Bang's eradication program there would have been significant increases in production in both cattle and cattle products which well might have depressed the prices and lowered the cattle owners' income by a great deal more than it costs to carry on the program.

Since the beginning of the national Bang's program in 1934, no new principles of vaccination have been developed. Vaccination both in theory and practice against Bang's disease is not new; it dates back to

SUMMARY OF POLK AND TREMPLEAU COUNTIES

POLK COUNTY			
42 PERCENT COMPLETED			
HERD POPULATION-----		4,129	
CATTLE POPULATION-----		62,644	
VOLUNTARY	46.3-----	PERCENT INFECTED HERDS-----	11.0
	13.1-----	PERCENT INFECTED CATTLE-----	1.0
AREA			
TREMPEALEAU COUNTY			
75 PERCENT COMPLETED			
HERD POPULATION-----		3,108	
CATTLE POPULATION-----		61,628	
VOLUNTARY	49.1-----	PERCENT INFECTED HERDS-----	12.2
	12.5-----	PERCENT INFECTED CATTLE-----	1.8
AREA			

Fig. 3.

1897, when Professor Bang carried out experiments in an effort to immunize against this disease. For over 30 years in the cattle-raising sections of the world, vaccine of one sort or another has been used, on a more or less extensive basis. Both the dead organisms in the form of a bacterin and the living organisms in the form of a vaccine received wide usage in our country during the past 25 to 30 years. From our viewpoint today, the bacterin is regarded as practically valueless. The virulent live culture vaccine, although possessing the property of conferring acquired immunity in some degree, is regarded as a detrimental product; its advantages are outweighed by the damage it causes. During the period that these products were in popular and widespread use, much praise was heard of them. It is interesting to look back to the

convincing statements in advertising material and to the articles which lauded the accomplishments of these products. A widespread firm conviction in the merit of the bacterin and virulent vaccine supported the usage of both during the past quarter century. We wonder today about the factors which contributed to the long tenure of two valueless and harmful vaccinal products enjoying extensive usage for such a long period. The answer lies primarily in the fact that Bang's disease has a peculiar behavior. As a result, it easily misleads particularly the herd owner, not infrequently the professional man, and sometimes even the cautious research worker. The unrecognized behavior of Bang's disease in a herd frequently led to the treating of herds during and immediately following active periods of the disease. The usual abatement of symptoms of the disease after a spell of activity credited advantage to vaccine or bacterin treatments where used. If nothing had been done, the result would have been about the same.

In this situation, cautions, warnings and even protests came from the ranks of the veterinary profession against the use of these products. These were of little avail, because of the interest and confidence cattle owners and others had in the products. Fortunately for the cattle industry of our country, the use of the bacterin did not result in the direct spread of the disease, except that herd owners having their cattle treated with this product labored under a false sense of security and in some instances this situation was responsible for the extension of the disease in the herd and into other herds. The situation pertaining to the use of the virulent live culture vaccine is far more serious, because its free and indiscriminate use during that long period resulted in the spread of deadly Bang's disease organisms onto virgin soil. Many new centers of infection were thus established. There was a time during which some of the producers of virulent live culture Bang's vaccine included the porcine strain, which is now recognized as being of higher virulence for the human being. Introducing the porcine, or swine, strain on

farms throughout the nation established this infection in many localities.

Such is the history of Bang's vaccination until just a short time ago, when it was necessary by federal government decree to withhold licenses for the production of these two vaccinal products. In evaluating this experience in the interests of cattle owners, certainly they have not received anything for the millions of dollars they have invested in a quarter century of Bang's vaccination experience. It had the unfortunate result of increasing the incidence of this disease in the herds of our nation.

The many cures for Bang's disease were enjoying a popularity which excelled even the popularity of the bacterin and the virulent vaccine. This popularity was much enhanced by articles carrying glowing reports from recognized herdsmen and prominent cattle owners of cures which produced marvelous results. The confidence in these cures like the belief in the value of the bacterin and the live vaccine, although at times inspired by commercial design, was for the most part built on honest observation, but on a failure to recognize the natural behavior of this disease.

This emphasizes the need for extreme caution in the acceptance of new vaccines or new treatments. We can salvage nothing out of the costly and disastrous vaccination experience of the past except the lesson to be cautious in the future. Truly, such a costly lesson should dictate extreme caution; it emphasizes the need for critically examining and evaluating the data in relation to any new product to determine its intrinsic worth before accepting it for general use.

That which I have referred to as a newer form of vaccination is the use of the Brucella strain, identified as number 19, under a calfhood-vaccination procedure, where calves are vaccinated between the ages of 4 and 8 months. Strain 19 is regarded as having reduced virulence.

In looking for critical experimental data, I find four sets of experiments which represent the essential critical experimental work

TABLE I—Protective index of *Brucella* vaccine (strain 19).*

IDENTITY OF EXPERIMENT	NO. CALVES 4-8 MONTHS OLD		PER CENT RESISTING INFECTION		PROTECTIVE INDEX† OF VACCINE 100 ± PERFECT
	NO. VACCINATED	NO. OF CONTROLS	VACCINATED	CONTROLS	
1) BAI, USDA (Cotton & Buck) 5 experiments	63	52	88.8	26.9	+61.9
2) Cornell Univ. (Birch, Gilman & Stone) 1 experiment	35	23	71.4	26.1	+45.3
3) Walker-Gordon (Hardenbergh) 9 groups	143	73	90.2	79.5	+10.7
4) Walker-Gordon Group V	15	16	33.3	50.0	-16.7

*Other than in a few animals in some of the BAI experiments, strain 19 vaccine was used.

†Protective index of vaccine determined by deducting the resistance shown by controls from the resistance shown by the vaccinated animals.

‡Buck, J. M.: The artificial immunization of cattle as a means of protecting against Bang's disease. *Proc. North Central States Bang's Dis. Conf.* (1938), pp. 30-32.

§Birch, R. R.: Personal communication (1940).

¶Hardenbergh, J. G.: Calftlood vaccination against Bang's disease. I. Effects on agglutination titres and results of first pregnancies. *J.A.V.M.A.*, xciv (May 1939), n. s. 47 (5), pp. 479-488.

carried out in this country. These data are presented in table I.

The data from these experiments were arranged in an effort to bring out in an understandable way the net protective value of the vaccine which is recorded under the protective index of the vaccine. Only calftlood experiments where adequate control animals and satisfactory experimental conditions existed were selected.

All five of the federal bureau of animal industry calftlood-vaccination experiments where strain 19 was primarily used were grouped together, and the results indicate that the protective index, revealed in these experiments, was 61.9.

The Cornell University experiment, which stands as the largest single experiment of its kind and which was conducted under conditions of natural exposure, reveals according to this method of figuring a protective index of only 45.3.

The Walker-Gordon experiment, carried out on nine groups of animals, where adequate controls were maintained, did not receive exposure by deliberate means. The protective index under such circumstances for the nine groups is 10.7. It is interesting to note under (4), which singles out group V of the Walker-Gordon experiment and which is one of the nine groups where

apparently natural exposure was greater, that there were more vaccinated animals that became infected than there were controls, and the index rating falls to -16.7.

The results, when averaged, indicate that strain 19, under a calftlood-vaccination plan, does have some protective value. Whether the level of value is adequate to aid effectively in the eradication of the disease in a national program still remains to be demonstrated. It is obvious that the amount of critical research work is yet too small. It will take considerably more critical research of this kind to shed needed light on the subject. Field experiments where control groups are not maintained under proper observation, even though they are conducted on an extensive basis, can not be relied upon to furnish competent data. It is not possible to correctly evaluate data when the probability exists that two thirds of the infected herds on experiment are in the quiescent state of the disease.

There is a possibility that the value which calftlood vaccine has may be coordinated into the eradication program in a useful way, but the demonstrations of its value under such conditions must first be shown through careful experimental procedure. Thus far, no serious effort has been made to work out the possible method

and technic in the use of calfhooed vaccine as an aid to the national eradication program. The trend seems to be to use the vaccine without reference to planned eradication.

Other aspects of the *Brucella* vaccine problem need to be mentioned for better understanding. Perhaps first I should point to the fact that Bang's disease in cattle is a chronic, infectious disease. The knowledge on immunology thus far makes it clear that acquired immunity, originating from organisms causing a chronic infectious disease, has not, up to the present time, been regarded as a satisfactory type of immunity. In this case we have no good precedent to follow. One of the other diseases with which we are amply familiar and which is regarded as a chronic infectious disease is bovine tuberculosis. In some foreign countries the idea of immunity to bovine tuberculosis is receiving attention much as Bang's vaccination is receiving here. It is plain to us here that a vaccination program of undetermined value, if it had been imposed on a tuberculosis-eradication program when it was about halfway along, would certainly have interfered seriously with the progress of that program. Were this done, today we would not have bovine tuberculosis in a stage of practical eradication.

One of the points which is of great importance in connection with the use of a calfhooed vaccine is that it should be of a lasting nature. To date there is insufficient data to indicate that calfhooed vaccination will last throughout the life of the animal. The experiments in table I record the protective index for the first pregnancy only. Although work is in progress in the observation of the lasting value of this vaccine, we still have a considerable way to go before we shall be in a position to make any definite statements about the duration of immunity from the vaccine. If the calfhooed-vaccination treatment does not endure throughout the life of the animal, then a serious situation will obtain, because as the animals grow older and lose the immunity established through vaccination early in life, they will arrive at a susceptible stage.

Revaccination of older animals carries with it some serious consequences which at present are not acceptable.

It still must be remembered that using the vaccine on calves under ordinary farm conditions does not relieve the herd owner of the immediate destructive effects of an active Bang's infection on the major portion of his herd. A lack of understanding on this point leads many herd owners to believe that by using the vaccine they can alleviate the stormy behavior of an actively infected herd. The fact is that what protection calfhooed vaccine may give is deferred to the period when the calves become mature. It gives no aid to the infection in the older animals.

There is still a great deal to be learned about the physiology of *Brucella* strain 19. Some producers of the vaccine have come fully to this realization after they have experienced a situation where vaccine which was made from their strain 19 and which was viable failed to produce immunity. In addition, the producer of vaccine can not guarantee the viability of the product after it gets out of his control. Past experiments have indicated that a significant portion of a group of vaccines collected after they left the manufacturer proved to be dead and nothing more than bacterins at the time that they were ready for use. A dead vaccine has no value.

It should be remembered that strain 19 vaccine contains living organisms. Introduction of a living organism, such as the *Brucella* germ, into any scheme of Bang's eradication would immediately raise questions in regard to public health relationships. Although it is acknowledged that *Brucella* organisms, even of the virulent type, have a low disease-producing index for the human, questions are sure to come up in the minds of consumers of dairy products relative to the safety of milk and other products from animals treated with the vaccine. Expediency would indicate that before any course is launched in the use of this product, sound and substantial data should be available to give the medical profession and the consuming public—data

carrying ample proof of the innocuousness of the strain 19 vaccine.

There is fascination in the idea that calfhood vaccine with the partial protective index which it possesses can be utilized as an aid in the eradication of the disease. This is a goal that should be eagerly strived for; however, observations of the trend of calfhood vaccination at the present time clearly indicate that the tendency is to use this product not as an aid to the eradication program but, rather, as a substitute for the program. This is a serious situation because it deals a heavy blow to the progress of an eradication program that has proved itself beyond doubt to be efficient. The promiscuous and irrational use of calfhood vaccine on a large scale at the present time is not only seriously interfering with the progress of the eradication program, but it is creating a situation in the minds of large numbers of well-intentioned herd owners which will deter them from giving the support to the Bang's eradication program which it must have to continue. After all, livestock owners themselves must show interest in the eradication program and be willing to speak for it if their representatives in state legislatures and in congress are to show sufficient interest to enact legislation to provide for the continuance of the program.

For the improvement of the economic status of the cattle owners of the nation it is imperative that Bang's eradication be continued, at least commensurate with the pace of the past four or five years. Keeping the work going at a pace consistent with efficient eradication procedure will not only serve to eradicate the disease at the earliest possible time, but it also will enable the accomplishment of this task at the lowest possible cost. The information on calfhood vaccination is not adequate to incorporate vaccination into the national Bang's eradication program at present. Every effort should be made to carry on researches to adequately demonstrate the value and place calfhood vaccine may have in aiding to eradicate Bang's infection from "problem herds" encountered in the national Bang's eradication program. The best interests of

the cattle owners of the nation require that eradication of Bang's disease be our goal.

What the Veterinary Service Does

Among the activities of the American veterinarian affecting general welfare in a large way are:

- 1) Eradication of tuberculosis in cattle, swine and poultry.
- 2) Extirpation of tick fever (bovine piroplasmiasis).
- 3) Suppression of Bang's disease (bovine brucellosis).
- 4) Vaccination against hog cholera, blackleg, anthrax, canine distemper and rabies.
- 5) Control of worm parasites and disease-bearing insects.
- 6) Elimination of plants injurious to live stock.
- 7) Studies of deficiency diseases affecting health, growth and reproduction.
- 8) Inspection of meat and milk destined for human use.
- 9) Nationwide veterinary-medical research.
- 10) The care of sick and injured animals in farms, homes and hospitals.

A survey of these ten planks comprising the platform of the veterinary profession will show that the omission or lax enforcement of any one of them would lead to unfortunate consequences for a population as dependent upon products of the farm as the United States. And yet, none of the ten is universally appraised or well understood by the beneficiaries of the veterinary service.

In these stirring times when food stands out as the determining factor of international conflict, it should not long remain difficult to build up a properly managed animal-conservation service—a service by expertly-trained veterinarians.

When vitamin A seems lacking think first of good old yellow corn and nice green alfalfa.

Vesicular Exanthema of Swine*

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A DISEASE simulating foot-and-mouth disease appeared in 1932 among hogs on three different garbage-feeding premises in Orange and Los Angeles counties, Calif. No particular significance was attached at that time to certain variations observed, and eradication procedures were adopted in accordance with the established custom of handling foot-and-mouth disease.

The following year the same disease made its second appearance, this time



Typical unruptured vesicle on top of snout.

among garbage-fed hogs in San Diego county. During the animal-inoculation tests incident to the establishment of a diagnosis, certain biological differences from foot-and-mouth disease were noted, namely, the disease was not transmissible to cattle and guinea pigs. Very mild "takes" were obtained in horses. These consisted in slight liftings of epithelium along the lines of intradermal tunnelling and scarification on the tongue, accompanied in most instances by slight thermal reaction. Inasmuch as foot-and-mouth disease virus is readily transmissible to guinea pigs and cattle and is nonpathogenic for horses, it was realized that either a new and hitherto unreported virus had appeared or that the virus of foot-and-mouth disease through some mutation had assumed a different biological aspect. Per-

mission to slaughter the hogs with indemnity, however, was obtained from the federal bureau of animal industry and eradication procedures were again adopted.

The third occurrence was in 1934, this time in the north central portion of the state, a distance of over 400 miles from the sites of the two previous breaks. The federal bureau of animal industry now declined to participate in the payment of indemnities, which rendered eradication attempts by the slaughter method impossible since state indemnities under California law are contingent upon federal participation. Rigid quarantine measures were adopted, in spite of which, however, the disease



Freshly ruptured vesicle.

spread to 31 premises before it was brought under control. Later that year, Traum^{1,2} described the disease and gave it the name "vesicular exanthema of swine."

During the early part of 1935, there was a mild recurrence on four ranches and it began to appear that the disease was subsiding. The following year, however, 14 hog ranches, all feeding garbage, experienced an attack of vesicular exanthema.

¹ Traum, J.: Foot and mouth disease. Rpt., 12th Int. Vet. Cong., II (New York, 1934), pp. 91.

² Traum, J.: Vesicular exanthema of swine. J.A.V.M.A., lxxxviii (March 1936), n.s. 41 (3), pp. 316-334.

*From the Division of Animal Industry, California State Department of Agriculture.

Crawford³ in 1936, working with virus harvested during the 1933 and 1934 breaks, reported upon four types of vesicular exanthema virus differing one from the other both immunologically and in their degree of pathogenicity for swine. During the time this work was being done experimentation with the same virus was in progress at the Riems Research Institute in Germany, as a result of which

of all the swine in the state, and had appeared in 25 counties.

The following table shows the number of premises upon which the disease has occurred, the season of occurrence, and the approximate number of swine involved:

Year		Premises	Hogs
1932	April-May	3	18,000
1933	March-April	4	5,500
1934	June-Dec.	31	95,000
1935	Feb.-May-June	4	13,000
1936	April-June	14	19,000
1939-40	Dec.-June	123	222,500

It will be seen that since 1932 there have been frequent reappearances of vesicular exanthema in California with a striking increase in virulency during the recent outbreak. It is of particular significance that on eight of the 123 premises comprising the last break, no garbage in any form was being fed. Definite contacts with infected premises could be established in four of the eight. However, in the remaining four no possible contacts could be established.

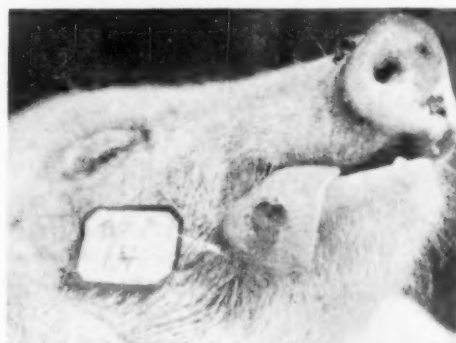
Clinical symptoms of vesicular exanthema of swine are identical to those of



Foot lesion 30 days after infection. Note irregular hoof growth.

Waldmann⁴ reported that the California virus was not foot-and-mouth disease.

From June 1936 until December 1939, vesicular exanthema did not appear. In December of last year, however, it again occurred in the San Francisco Bay area. The disease spread with such alarming rapidity that by June 30, 1940, it had occurred on 123 premises involving over 222,500 hogs, or approximately one fourth



Ruptured vesicles on tongue, snout and lips.

foot-and-mouth disease in this species. It is an acute febrile disease caused by a filter-passing virus and characterized by vesicular formations on the snout, lips, oral mucosa, tongue and feet. Vesicles when appearing on the anterior surface of the snout frequently extend into and involve one or both nostrils. Foot vesicles appear around the coronary bands, in the interdigital spaces, on the pads and at the dew claws. Affected animals may exhibit lesions at all of the above sites or in com-

³Crawford, A. B.: Experimental vesicular exanthema of swine. Proc. 40th Ann. Meet., U. S. Live Stock San. Assn. (1936), pp. 380-395.

⁴Waldmann, O. (Trans. by M. Dunlop): Foot and mouth disease or vesicular stomatitis; an attempt to classify an American virus. Arch. f. Wiss. u. prakt. Tier., lxxviii (1934).

binations of two or more of the same. The vesicles range from 2 or 3 mm. in diameter up to a size sufficient to cover the entire top of the snout or the entire bearing surface of the pad. Vesicles also appear upon the teats of nursing sows.

The incubation period is short. Vesicles have appeared in less than 24 hours following artificial infection, the average incubative stage being about 48 hours. Secondary vesicles have been noted to appear as late as 96 hours after original vesicle formation. Temperatures range up to



Typical lesions at the coronet.

108° F. and decline rapidly after the vesicles rupture.

Vesicles upon rupture exude a clear vesicular fluid, leaving a raw surface underneath, after which healing takes place rapidly. Affected animals exhibit varying degrees of lameness, this being especially severe in heavy animals. Animals in the initial stage of the disease refuse to eat and often squeal with pain when forced to move.

Upon recovering, swine are immune to reinfections with the same virus for a temporary period. The duration of immunity has not been definitely determined. During the recent break, recovered animals remained resistant to reinfection inoculations made after 46 days. At the same time a susceptible control readily developed typical lesions. Wicktor and Coale⁵ report

⁵ Wicktor, C. E., and Coale, B. B.: Vesicular exanthema. *Vet. Med.*, xxxiii (1938), pp. 516-518.

reinfections of recovered animals after a period of seven months although the severity of the second attack was greatly reduced.

During the 1939-40 break, the disease has taken on an economic aspect not previously encountered. The setback in growth and development in affected herds frequently has been pronounced. Some owners report that fully 30 days longer was necessary in order to get the animals to marketable weight after recovering from vesicular exanthema than ordinarily would have been required. Serious death losses were encountered in pigs 3 weeks of age and younger. Losses in animals of this age sometimes amounted to from 90 to 100 per cent. These losses are apparently the result of two factors: first, mechanical interference with respiration as a result of vesicles in and around the nostrils with subsequent scab formation following rupture, and second, the cessation of lactation in the nursing sow. Death losses of this magnitude represent serious monetary losses in large breeding units.

In an initial outbreak, it is necessary to resort to animal inoculation in order to differentiate vesicular exanthema from foot-and-mouth disease. Two horses, three guinea pigs, two calves and three or more swine are used. After a diagnosis has been established, subsequent occurrences in the vicinity are handled by quarantining all animals on the premises and exposing two calves either by pen exposure, or as most frequently practiced, by scarifying the lips and dental pads and inoculating virus material taken from affected swine directly into the scarified areas.

Such contact animals are kept under official supervision for a period of 14 days, quarantines remaining in effect until all active cases among swine on the ranch have subsided, the lesions completely healed, and no further evidence of disease remains on the premises. This usually requires from four to six weeks.

In considering the epizootiology of vesicular exanthema during the last occurrence of the disease, it would appear that

(Continued on page 237)

Symptoms and Pathological Characteristics of Some Diseases of the Brain in Dogs: Report of 78 Cases*

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DISEASES of the brain and spinal cord are of frequent occurrence in dogs. The etiology of these diseases varies, but the symptoms frequently are similar. The symptoms commonly indicate the site of the disease only and are not specific for any single etiological agent.

This report will deal with the symptoms and pathological features of dogs affected with various diseases of the brain other than rabies. The symptoms and lesions noted in 78 cases will be considered.

LESIONS ENCOUNTERED IN 78 CASES

Encephalitis was observed in 53 dogs. The histological character of these lesions varied as follows: Lymphocytic infiltration and edema associated with degeneration and destruction of nerve cells were noted in 44 cases of encephalitis. These lesions were disseminated in 30 cases and focal in 14. The pathological changes were typical of those caused by various neurotropic viruses and bacteria. The cells found were chiefly lymphocytes, commonly termed "round cells." They were most abundant in the perivascular spaces and in the tissues immediately adjacent to the vessels. In most of these cases also slight cellular infiltration of the meninges was present.

Disseminated degeneration without lymphocytic infiltration was observed in seven cases of encephalitis. The pathological features varied from slight changes in morphology to complete disappearance of certain nerve cells. Localized areas of gliosis in which there was complete disappearance of the large nerve cells were noted in two dogs. In one case the lesion was situated in the cerebellum near the cere-

bellopontine angle and in the other a small focal lesion was present in the gray matter in the motor area of each cerebral hemisphere.

Liquefaction necrosis and hemorrhage were noted in two cases, in one of which a focal lesion was present in one cerebral hemisphere; in the other similar lesions were present in the cerebrum, cerebral peduncles and medulla. These lesions appeared to be of recent origin, because there was no evidence of encapsulation or cellular reaction in the surrounding tissues and the symptoms occurred suddenly. Scattered areas of demyelination and destruction of cells were observed in the remaining six cases. The demyelination was most evident in the white matter, whereas destruction of cells was most marked in gray matter of the cerebrum.

Hydrocephalus internus was observed in 14 dogs. In four hydrocephalus was unilateral, and in ten it was bilateral. In three of these ten cases both lateral ventricles and the aqueduct were distended.

In the cases of unilateral hydrocephalus, obstruction to the outflow of the cerebrospinal fluid appeared to be caused by adhesions in the interventricular foramen. In seven cases of bilateral hydrocephalus the obstruction appeared to be in the interventricular foramen or the aqueduct and, in the three cases in which dilatation of the ventricles and aqueduct was present, the obstruction was thought to be in the foramina of Luschka and Magendie or in the narrow subarachnoid space at the level of the tentorium.

Cystic degeneration of one cerebral hemisphere (porencephaly) was noted in one dog. A large cyst was present which had perforated the dorsal portion of the right cerebral hemisphere. This caused the ventricle to appear larger than normal, but this

*From the Division of Experimental Medicine, The Mayo Foundation; presented at the North Carolina Veterinary Conference, Raleigh, N. Car., January 23-25, 1940.

lesion was not due to, or associated with, an increase of intraventricular pressure, because there was no distortion of the ventricle.

Meningitis was the principal lesion observed in three dogs. Marked infiltration of lymphocytes and segmented leucocytes was noted in the meninges, but not in the substance of the brain. The segmented leucocytes were more abundant in these cases than in the cases of encephalitis. At necropsy the cerebrospinal fluid was found to be turbid and appeared to be markedly increased in quantity.

Intracranial neoplasms were observed in three dogs. One of these was a glioma and was primary in the cerebrum. The intracranial tumors in the other two cases likewise were situated in the cerebrum, but they were metastatic in origin. In one case the primary neoplasm was situated in the right adrenal gland and in the other in the left parotid gland. In the latter case metastatic neoplasms were also present in the regional lymph nodes and skin.

Demonstrable lesions were absent in 4 of the 79 cases, but because of the clinical history these were classified as cases of idiopathic epilepsy. The symptoms had been observed early in the life of the dogs and had continued to occur at irregular intervals for several months. Other causes for the symptoms, such as deficiencies of vitamins, proteins or fats in the diet, intestinal parasites, uremia, hypocalcemia or hypoglycemia, could not be demonstrated.

SYMPTOMS OF NERVOUS DISEASE

The symptoms manifested in various nervous diseases usually indicate the site of the disease but not its etiology or the size of the lesion. Lesions attributable to various causes will produce similar symptoms when they occur at the same site. Focal lesions from any cause commonly cause localized symptoms, such as convulsions of certain muscles, whereas disseminated lesions usually cause general symptoms characterized by epileptiform seizure, incoördination of movements and disturbances of psychic behavior. A small focal lesion, however, can cause severe general

symptoms if it interferes with the circulation of the cerebrospinal fluid. Likewise disseminated lesions may be situated in so-called silent areas of the brain and cause only local symptoms or no objective symptoms at all.

Any disease of the cerebrum of dogs and other lower animals commonly manifests itself by disturbances of psychic behavior, impaired intelligence, incoördination of movements and epileptiform seizures. These symptoms may vary in degree. Vomiting and loss of sight and smell sometimes are observed but may be due to various causes and in the absence of other more definite symptoms are not significant of disease of the brain.

Disturbances of psychic behavior are manifested by excitement, irritability and hysteria, or lassitude, depression and coma. All of these symptoms have their origin in the cerebrum and are frequently transient, but their etiology varies greatly.

Factors Other Than Organic Lesions of the Brain Capable of Producing Symptoms.—In my opinion, certain dogs have hereditary predisposition to the development of hysteria and epileptiform seizures because certain causes will incite these symptoms in some dogs but not in others. Intestinal parasites apparently can cause epileptiform symptoms in some puppies. Likewise, it has long been thought that diets deficient in certain substances produce various symptoms of nervous disease. Recent reports, dealing with vitamin B₁ and proteins, tend to support these theories. Patton¹ has demonstrated that diets deficient in vitamin B₁ cause symptoms of hysteria in dogs. The recent work of Arnold and Elvehjem² indicates that the protein fraction of a diet is equally as important as its vitamin B₁ content. Baashuus-Jensen³ stated that in the Arctic regions hysteria commonly is observed in dogs that are maintained on fat-

¹ Patton, J. W.: Fright disease an avitaminosis. *Vet. Med.*, xxxiv (June 1939), pp. 372-381.

² Arnold, A., and Elvehjem, C. A.: Is running fits a deficiency disease? *J. A. V. M. A.*, xcv (Sept. 1939), pp. 303-308.

³ Baashuus-Jensen, J. (quoted by R. L. Anderes): Arctic nervous diseases. *No. Amer. Vet.*, xvii (May 1936), pp. 44-46.

free diets. The mere addition of animal fats is said to effect cure.

I repeatedly have observed hysteria in hunting dogs that were maintained on a meatless diet during the closed season. Symptoms of cerebral diseases were manifested when they were first subjected to strenuous work in the fall. These symptoms usually disappeared when they were given a diet of 50 per cent or more of raw beef two or three times each week. However, it is possible that the symptoms were due to hereditary predisposition to epilepsy and that the dogs were able to condition themselves to the excitement of hunting after a few days.

In 1927, I observed hysteria in several apparently normal adult dogs that were fed exclusively on a certain brand of commercial dog biscuits. The symptoms occurred as early as the third day of feeding and disappeared as soon as the diet was changed. Similar results were obtained when this experiment was repeated. Since the symptoms occurred as early as the second day after feeding these biscuits and promptly disappeared when feeding was discontinued, it seems unlikely that the symptoms could be attributed to a deficiency of some food element. In my opinion, the symptoms were caused by intestinal irritation or some toxic substance in the biscuits because diarrhea developed in all cases.

Epileptiform seizures and hysteria have been observed in puppies that have eaten indigestible material, such as paper, rags, wood fiber and bones. It was thought that the symptoms were related to the gastrointestinal irritation resulting from the foreign material. This may be right, but it must also be kept in mind that animals affected with certain nervous diseases commonly eat foreign material. Therefore, in some cases the eating of the foreign material may be due to the disease causing the nervous symptoms.

Symptoms Produced by Various Lesions of the Brain.—When symptoms of hysteria and epileptiform seizures occur at irregular periods and have been noted for weeks or months, organic disease usually is pres-

ent. Frequent, recurrent epileptiform seizures were observed in a St. Bernard dog for three years. Internal hydrocephalus was suspected but was not definitely diagnosed until after death. At necropsy moderate bilateral hydrocephalus and hydromyelia were found. The obstruction apparently was present at the foramina of Luschka and Magendie or at the narrow arachnoid space at the level of the tentorium. Two dogs affected with unilateral hydrocephalus manifested similar symptoms for a period of three or more years. In another dog that was thought to have recovered from a severe attack of encephalitis, epileptiform seizures and convulsions of the muscles of the left fore leg suddenly developed several weeks later. These epileptiform attacks increased in frequency and the owner requested that the dog be destroyed. Necropsy failed to reveal gross lesions, but microscopic examination revealed two focal lesions on the surface of the cerebrum in the motor area. The large nerve cells had disappeared from these lesions and only the connective tissue elements remained. It was thought that these lesions were residual from the previous attack of encephalitis. It is possible that these lesions caused symptoms by the complex mechanism discussed by Penfield.⁴ He is of the opinion that such lesions cause symptoms by pulling on the vasastral framework of the brain.

Epileptiform symptoms that were sudden in their onset and progressed rapidly during the next three days were observed in one case of metastatic intracranial tumor. At the beginning of each seizure the dog drew her head down to the left. Several subcutaneous nodules were present and because of the symptoms the presence of a metastatic tumor in the left frontal lobe was suspected. Necropsy confirmed this diagnosis.

Hysteria and epileptiform seizures were observed in 6 of the 15 cases of focal encephalitis and in 18 of the 38 cases of encephalitis in which the pathological changes were disseminated throughout the brain.

⁴ Penfield, W.: Epilepsy and surgical treatment. Arch. Neurol. & Psychiat., xxxvi (Sept. 1936), pp. 449-484.

There was no apparent relationship in the occurrence of these symptoms and the character of the lesions; for instance, demyelinating lesions without lymphocytic infiltration can cause symptoms similar to those caused by lymphocytic infiltration. Disturbances of consciousness, psychic behavior and of coordination of movement were noted in all of the dogs affected by disseminated encephalitis. There was marked variation in the rate of development of the symptoms. Some cases were observed for several months.

Uncontrolled movements, such as the clonic convulsions of one or more muscles or groups of muscles, are common symptoms of post-distemper encephalitis. In these cases the disease usually is localized to one portion of the cerebrum. Continuous walking, walking in a circle and a tendency to an unnatural gait are indicative of destructive disease of the cerebrum. These are common symptoms of encephalitis of the disseminated type. Ataxia in the absence of psychic disturbances and paralysis commonly is noted in cases of encephalitis limited to the cerebellum. Clumsy or awkward gait associated with impaired intelligence and loss of sight are prominent symptoms of hydrocephalus. I have never observed uncontrolled movements, such as convulsions, in cases of hydrocephalus.

Paralysis of the legs usually is absent when the disease process is limited to the brain, but the animal may be unable to stand or walk because of lack of coordination of movement. Definite paralysis of the legs in dogs usually is due to lesions of the spinal cord. However, lesions of the cerebral peduncles and medulla involving the motor tracts can cause paralysis of the legs. Paralysis of the facial muscles and muscles of the throat is common in encephalitis caused by the rabies virus because this virus has an apparent affinity for certain nuclei in the brain.

Convulsions of one or more muscles or groups of muscles are the most common symptoms noted in animals affected with encephalitis of the focal type. This frequently occurs following distemper and is

commonly termed "chorea." It usually does not affect the mentality, but it is incapacitating.

In three cases of internal hydrocephalus hysteria and epilepsy were the only symptoms. The most prominent symptoms in the remaining eleven cases were progressive loss of intelligence, clumsy awkward gait, mental depression and impairment of vision. The symptoms differed from those of encephalitis of disseminated type in that paralysis, convulsion and other uncontrolled movements were absent in all of these cases. Papilledema, or choked disk, was present in all of the dogs in which impairment of sight was marked.

Similar symptoms were noted in one dog that had metastatic intracranial neoplasm. This dog also manifested symptoms of destructive encephalitis. Uncontrolled movements, high stepping and walking in a circle were observed. The tumors of this dog caused rather marked hydrocephalus and also destroyed some brain tissue by direct pressure.

Gradual loss of intelligence was the only symptom noted in the case of cerebral cyst, porencephaly. This dog was purchased when he was a puppy and was maintained in the same household for two years. The owner noticed that the dog appeared to lose intelligence as he grew older. He learned readily as a pup, but at 2 years of age he apparently had forgotten what he once knew and it was impossible to teach him to obey simple commands. Necropsy revealed marked cystic degeneration of the right cerebral hemisphere. The left hemisphere appeared hypertrophic. This lesion apparently did not cause any change in the intracranial pressure as there was no distortion of the septum pelucidum or other structures.

The symptoms of the three dogs which had meningitis were sudden in onset and very severe. Inflammatory disease of the meninges can cause interference with the circulation of the cerebrospinal fluid and symptoms of a general nature. Severe epileptiform seizures, convulsive movements, rigidity of the muscles of the head and neck and hyperesthesia of the skin over

the head and neck were observed in all three animals.

Sudden epileptiform seizures that progressed to coma and persisted until death were the chief symptoms of degenerating glioma in the posterior pole of the cerebrum in one dog and of hemorrhagic encephalitis and liquefaction necrosis in two dogs. In one of the latter cases the lesions were focal and were confined to one cerebral hemisphere. This dog remained in coma but lived for several days. The lesions in the other case were multiple and the dog died within 24 hours of the onset of symptoms.

COMMENT

The etiology of the diseases of 79 dogs was various. In some cases the nervous disease occurred secondary to some systemic ailment, but in most of the cases it was primary in the nervous system.

Many of the cases of encephalitis of focal type in which lymphocytic infiltration was noted and all of the cases of meningitis occurred following, or in association with, distemper or some other general disease. On the other hand, a large number of cases of disseminated encephalitis in which lymphocytic infiltration was marked, occurred during the summer, fall and winter of 1936 and 1937. Equine encephalomyelitis was prevalent in Minnesota at that time. In view of more recent knowledge in regard to the pathogenesis of this disease, it is possible that some cases of encephalitis in dogs may have been caused by the virus of equine encephalomyelitis.

Cultures and tissue inoculations were not made in all cases because many of the animals survived for several weeks or months after symptoms were noticed first, but cultures were made and suspensions of brain were prepared and inoculated into experimental animals from all of the dogs that succumbed within three weeks after the onset of symptoms. Streptococci were isolated from the brain in some cases, but these were nonpathogenic for other dogs. The tissue inoculations gave negative results in all cases.

Inclusion bodies were observed in two

cases. In one case the inclusion bodies were in appendymal cells and in lymphocytes. They resembled the inclusion bodies that frequently are seen in cases of distemper. In the other case the bodies were in the cytoplasm and nuclei of some Purkinje's cells. Those in the cytoplasm of the cells resembled Negri bodies, but all of the cells that contained a cytoplasmic inclusion also contained a nuclear inclusion body. I have never observed this in rabies. Too, inoculation of suspensions of brain tissue into guinea pigs gave negative results.

—Vesicular Exanthema

(Continued from page 232)

this affection now has established itself as a definite swine-disease entity of major importance and one with which swine producers and veterinarians will have to cope. Its importance from an economic standpoint alone can not be overemphasized. By virtue of the fact that clinical symptoms are identical to those of foot-and-mouth disease, the problem of differential diagnosis is of extreme importance. Great care should be exercised in order that true foot-and-mouth disease may not be mistaken for vesicular exanthema.

Much is yet to be learned relative to reservoirs of the virus, immunity, carriers and other facts pertinent to the control and eradication of vesicular exanthema of swine.

Susceptibility to Mammary Cancer Low in Cows

In a study of lesions of various types found in the udders of over 400 cows, heifers and freemartins examined by Swett, Mathieus and Graves of the federal bureau of dairy industry none of them was of a cancerous nature, notwithstanding that 31 per cent of 313 cows of milking age were over 8 years old—the age at which growths of the mammary glands of other animals are apt to be malignant. The conclusion of these authors is that the cow's udder "is practically free from cancerous growths."

The Relation of Bacterial Foci to Canine Pathology *

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FOCAL INFECTION is a clinical term which implies relationship between a circumscribed area of infection, the focus, and an infection elsewhere in the body, both of which must show evidence of inflammation and infection.

A focus of infection is an area of tissue infected with pathogenic organisms capable of producing secondary foci in different parts of the body. The part that focal infection plays in certain systemic diseases is a well-established fact.

Focal infection is a chronic process beginning in some epithelial defect, later involving remote parts of the body by establishing new bacterial colonies or by toxemias, caused chiefly by streptococci and sometimes by staphylococci. These organisms vary greatly in their affinity for different tissues of the body. Focal infections are not only areas in which these organisms multiply and enter the blood stream, but also places where tissue affinity is acquired and from which microorganisms and toxins are spread.

Infecting organisms which have become established and are elaborating toxins at the point of secondary foci are not removed by the extirpation of diseased tissue at a primary focus, as in the upper respiratory tract. For example, after the removal of infected tonsils which were the site of primary foci, the dog may not show the expected improvement because the organisms in secondary foci are still producing toxins which are liberated in the blood stream.

We are inclined to think primarily of the organisms found in upper respiratory infections in relation to the normal bacterial flora and to overlook the chemical reaction produced as a result of their toxins. In view of the fact that dogs and cats do not cough up and expectorate the material produced

by bacteria and their growth products but, instead, swallow them, severe irritation to the gastrointestinal tract may result. This condition in itself may set up secondary infections.

Most secondary systemic infections are produced by organisms carried from the original focus by the blood or lymph streams. In some cases it would appear that the original lesion becomes encapsulated and only the toxins are absorbed, causing damage to the various organs.

The fact that certain organisms are found on or in the body of the dog is not necessarily important if the defense mechanism remains intact. But if the local susceptibility is greater or the organism a little more virulent, there may be a slow growth of bacteria in the tissue with a slow cellular response which results in the establishment of a focal infection. Contributing factors are increased susceptibility or lowered resistance, such as fatigue, chilling, dietary troubles and vitamin deficiencies.

Every case of focal infection is an individual one—there are not two alike. Some may be difficult to locate, and it may be impossible at times to decide whether or not a localized variation from normal in a tissue is indicative of a true focus.

When bactericidins and other antibodies are produced or increased in response to proper vaccine therapy, they often are able to destroy the bacteria in the secondary foci and render their toxins harmless. Kolmer believes that the administration of an autogenous bacterial vaccine should be an important aid in increasing resistance to infection. Such a bacterin, while of high antigenic value, contains bacteria and their toxins and is so potent and specific that its administration demands great care as to dosage.

The antibody titre of a particular sample of serum as measured *in vitro* is not highly correlated with its power to protect *in vivo*,

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and resistance to a particular organism has frequently been associated with the entire absence of demonstrable complement-fixing bodies.

THE TONSILS

Beattie has stated: "It is significant that in various infections a common starting point is the throat. One of the earliest symptoms is 'sore throat' and in such cases hemolytic streptococci can generally be demonstrated in large numbers, and these same organisms are later found in the complicating lesion."

If this is true in the human family, why is it not also true in the animal kingdom? We often find these same organisms in the various organs following such diseases as canine distemper.

The body of the tonsil is composed of lymphoid tissue. Therefore, this organ may have the attributes of other lymphoid tissues, that is, its exposure to infection is unique, its structure is such as to harbor bacteria, and infection is primarily of a direct nature. This organ then may contain bacteria, including spirochetes, and may be a reservoir for filtrable virus diseases particularly adaptable to the upper respiratory tract.

Function.—The function of the tonsils, of which we have no direct knowledge, has led to many theories: first, production of lymphocytes; second, internal secretory function; and, third, protection against invading organisms. Disregarding these, we believe that infected tonsils are better off in a bottle than in the patient.

Theories.—The theory is advanced that under suitable circumstances, streptococci, or their products, are disseminated to the tissues. These tissues overreact and the characteristic picture of disease results; but when a state of immunity exists, the dissemination of streptococci results in a minimum of injury to the tissues and the characteristic symptoms of disease fail to appear. If these streptococci are toxin producers, then the desensitization by small doses of streptococcic toxins over a long period of time is very important.

The question arises as to whether these

organisms exert their toxic influence from the tonsils or whether they enter the body from that portal and are then disseminated to other parts of the body.

Removal of the tonsils may cure such infection and prevent its recurrence. Perhaps a great deal of canine ear trouble may be due to infected tonsils. Tonsils may be one of the foci in which the repeated "low-grade infections" occur. We all have seen these so-called distemper-like diseases.

Time did not permit studies of blood cultures after removal of dog tonsils, but some authorities suggest that shortly following the removal of the tonsils in acutely infected cases, a bacteremia may be present, although it is commonly of a transitory nature.

Frederic, quoted by Henke, injected carmine into the blood of a dog and a day later found it in the white cells of the tonsils and, in part, free in the tonsils, some going through the epithelium.

Henke injected suspensions of finely divided carbon beneath the septal and turbinal mucous membranes of living human subjects. He reported finding the granules 24 hours later in both tonsils, although the injections were unilateral. In no case were the granules found in the blood vessels, although the perivascular lymph sinuses were crowded with them, from which he concluded that the particles were borne to the tonsils through the lymphatics and not by the blood stream. He also produced the same experiment by injecting the gums of a cat.

One can readily understand that various germs or toxins from chronic tonsillitis may be added to the food in swallowing. This may result in digestive disturbances, which may be corrected by removal of the infected tonsils.

The organism may invade the tonsils and multiply or accumulate there until the resistance of the host is decreased from fatigue or from disease, permitting it to invade the blood stream.

The infectious substances are probably dispersed into the body either directly from the diseased veins or by thrombophlebitis into the internal jugular vein. Infected

materials are given off into the general circulation and may settle in the lungs, causing pneumonia. Other material may cause empyema due to suppurative infection. As a result multiple metastatic abscesses occur in other parts of the body, such as joints, kidneys, spleen, liver, sinuses and skin. We have observed suppurative meningitis and death following acute attacks of distemper in dogs.

Fraenkel, Mosher and Hirsch have shown that after the removal of chronically inflamed tonsils in human patients, even the smallest veins in the tonsillar region were thrombosed, phlegmons or abscesses spreading downward and involving vessels either in continuity or segmentally. They also found suppuratively inflamed lymphatic glands touching the vein and infecting it secondarily.

Hirsch states: "Septicemia exists when a center has formed inside the body from which pathogenic septic bacteria constantly or periodically disperse into the blood stream to such a degree that by this invasion subjective and objective symptoms of disease occur."

Many general systemic disorders that result from a focus of infection are due either to absorption of toxins or a bacteremia with infection of the corresponding lymph glands and the formation of bacterial emboli in the other organs of the body. There was apparently no relationship between the types of bacteria found in the tonsils and the clinical symptoms of the dogs, except in cases where there was definite enlargement and tenderness of the corresponding lymphatics.

CLINICAL EXAMINATION

One of the best and most reliable indications of infection in a large percentage of cases is redness of the tonsil or its immediate surroundings. Sometimes only a group of hyperemic patches with a fine network of radiating blood vessels may be seen. Examination of the tonsil crypts is almost impossible, but if pressure is applied to the organ, hidden trouble frequently may be found. In many instances the tonsillar guilt may be arrived at by

a process of exclusion, such as malnutrition, toxemia, various digestive disturbances, neurological symptoms—in fact, most conditions or diseases where buried pus organisms may play a part because of toxin production.

We have observed dogs with typical red patches on the skin, vomiting, high temperatures, loss of appetite, conjunctivitis, enlargement of the cervical lymph glands, and a peculiar redness of the tonsils with radiating lines of redness from them which, in my opinion, were characteristic of streptococcic tonsillitis.

Removal of the tonsils with supportive treatment will usually correct the conditions in four to five days. In these cases, I believe, the tonsil acts as an incubator for the streptococci and other types of organisms living in symbiosis, as it has all the incubator attributes of heat, food and moisture.

Until recent years tonsils did not receive proper recognition in veterinary practice. We had no idea they contained the kind and types of organisms which we have found. Because of the actual anatomical structure of the tonsil, treatment with medicinal agents is almost an impossibility. In fact, manipulation of diseased organs may do more harm than good. Often the patients are worse off than if they had received no medication whatever because the cause has not been removed and, without removal of the diseased organ, little can be accomplished. Hence, if I believe my patients are going to be benefited by removal of the tonsils, I remove them, but I try not to promise relief when other conditions actually exist. This brings me to believe that the fault often lies with the operator and not the operation.

Tongs placed tonsils in 25 per cent silver nitrate for five minutes and later obtained 83 per cent positive cultures from them. This shows the folly of treatment except for superficial cleansing. As we have shown, after searing the surface of the tonsil with a hot spatula, we still were able to isolate the various organisms from the crypts.

OUR EXPERIMENTS

The study was accidentally begun while we were performing debarking operations. Dogs that had been allowed to run freely, then suddenly confined in close quarters, instinctively attempted to escape and, in so doing, indulged in protracted barking. As a result, they developed pharyngitis and laryngitis. After removal of the vocal cords or the innervation of the voice box such dogs developed a definite hypertrophy of the tonsils which often actually obstructed breathing. Sometimes they developed only a general sore throat with tonsillar involvement. Therefore, we began removal of the tonsils in dogs whose corresponding cervical lymph glands were enlarged and easily palpated. After removal of the tonsils these lymph glands became smaller, or normal, and the general condition improved.

The statement that an attack of acute tonsillitis renders the individual temporarily immune to a variety of dangerous infections does not always prove true. In the study as to what type of tonsils menaced health of confined dogs and should be surgically removed, an attempt was made to investigate the type of bacteria present in the tissues of both normal and diseased tonsils.

When we found that such a large percentage of dog tonsils contained streptococcal organisms, we consulted the literature and found that a large percentage of human throats and tonsils contain some form of streptococci. Ample proof also is cited that tonsillectomy frees the throat of this type of infection.

Dogs are not bothered with such antiseptic agents as tooth powders, liquids and brushes. They rely on bones, food, grasses, etc., to remove mucus. It must be remembered also that a dog does not expectorate, but must swallow whatever mucus may accumulate as a result of upper respiratory infections. Therefore, digestive disturbances and chronic intoxication usually follow. Also, there is sufficient evidence to indicate the wide distribution of streptococcal organisms which, when the proper opportunities are offered, enter the blood

stream and produce many diseases and lesions. It seems that this streptococcal organism may be dormant, as if it were waiting for an opportunity to become active upon lowered resistance of its host. It is in the tonsil that this opportunity is constantly present.

Our experiment consisted in removing the tonsils, placing each pair in a separate sterile test tube and taking them to the laboratory for bacteriological examination.

Whole tonsils showing areas where there was the least amount of trauma were held firmly with a hemostat. The surface was seared with a hot spatula. A platinum loop gently pushed through the seared surface into the body of the gland was used to inoculate sugar-free media. This liquid media is suitable for the growth of streptococci and other types of bacteria. After incubation of these cultures for 48 hours at 37° C. they were plated on blood agar in Petri dishes. Colonies were then picked and the organisms identified by microscopic examination and cultures in carbohydrate media.

Of the 200 tonsils examined the cultures consisted of the following:

Streptococci and hemolytic....	89	(44%)
<i>Corynebacterium pyogenes</i>	23	(11%)
<i>Staphylococcus aureus</i>	10	(5%)
<i>Staphylococcus albus</i>	30	(15%)
<i>Brucella bronchiseptica</i>	12	
<i>Escherichia coli</i>	6	
<i>Eberthella typhosa</i>	2	
Actinomycosis	14	
Apparently sterile	14	

When the same organism was recovered from each tonsil of the same dog, we counted it as one.

RELATION OF TONSILLITIS TO OTHER GENERAL INFECTIONS AND DISEASES

Acute nephritis in old dogs may be associated with chronic tonsillitis of pyogenic or streptococcal origin. It is usually manifested by albumin in the urine, edema of the eyelids and dry, lifeless skin.

Tonsillar infection often is related to: arthritis, which is particularly common in old dogs; nonsuppurative otitis media, found in hunting dogs with large ears; iritis, choroiditis in dogs with protruding eyes,

such as the Boston and Pekingese; bronchial pneumonia as a secondary infection, probably a result of aspirating the infecting material; and recurrent vomiting, which is frequently found in Bostons. We have found that removal of the tonsils in this breed often corrects the persistent vomiting.

Rhoeds and Dick believe that disappointing results following tonsillectomies are often due to incomplete removal. They found that the "stumps" harbored more bacteria per gram than the whole tonsil.

KIDNEYS AND URINARY TRACT

Hayden has shown in his work with rabbits that the kidneys receive the brunt of most focal infections. He inoculated rabbits intravenously with 5 cc. of a 24-hour brain-broth culture of a nonhemolytic streptococcus obtained from cases of focal infection. Four hundred and sixteen rabbits were inoculated and killed six days later. On postmortem examination 166, or 40 per cent, showed gross lesions in the kidneys. The lesions encountered were cortical abscesses, pyelonephritis, acute hemorrhagic nephritis and subacute parenchymatous nephritis.

He concluded that the frequency of kidney lesions occurring after intravenous injections clearly showed the great pathogenicity for kidney tissue of the bacteria recovered from chronic foci and that the lesions produced in humans were similar to those produced in animals.

A great variety of bacteria may enter the blood stream through foci of infection in the upper respiratory tract. Many of these bacteria produce secondary infections in the kidneys while some are destroyed almost immediately by phagocytic action in the blood stream. There is, however, a certain group that reaches the kidneys with considerable regularity and produces definite lesions. As stated before, those that we recognize are pus-producing cocci and colon organisms which often produce clinical symptoms. I mention this because we have all seen cases of upper respiratory infections in dogs during the course of which the temperature fails to

return to normal as would be expected from the favorable appearance of the lesions in the throat. Still the temperature remains slightly elevated, perhaps due to some kidney lesion. If we test the urine of these dogs, we find it full of pus cells, a trace of albumin and occasionally some blood.

Symptoms.—Dogs that develop pyelitis and possibly nephritis have severe muscular pain, often crying or whining when handled or when lying at rest at night. They all show a characteristic arched back and walk "humped up." A slight elevation of temperature is noted.

Urination is frequent, usually small amounts at a time, and of strong odor. Vomiting is frequent.

Pathology of Kidneys.—The pathological changes found in the kidneys of dogs are not entirely characteristic of definite foci of infections. The small abscesses found in the structure of the kidneys produce cultural growth of staphylococci. They are, however, rarely found except in old dogs. It should be recognized that the production of lesions in dogs is by no means easily accomplished even after intravenous injections of the organism usually found in the animals.

Treatment.—Urotropin is the most useful of urinary antiseptics. Its beneficial action is due to the fact that it is broken down with consequent formation of formaldehyde. It should be remembered that this drug action follows its contact with urine having a pH below 6.0. Often it is inadvisable to render the urine acid. The writer has seen many cases where it was advisable to render the urine alkaline, which was necessary before the dogs recovered.

The drugs used intravenously are gentian violet, acriflavine, formalin, mercurochrome and nearsphenamine. More recently we have found that the oral administration of Mandelic acid is beneficial. We recommend calcium mandelate in 8.45-gr. doses, giving from four to eight tablets daily. These contain 7.5 gr. of Mandelic acid. This drug renders the urine alkaline.

URINARY INFECTIONS

Discovery of the etiologic bacterial infections of the urinary organs and pass-

ages is difficult due to the uncertainty attending bacteriological examination of the urine in animals.

Organisms of the colon group were regarded as the chief cause of urinary infections, but Dudgeon and others have clearly shown by repeated inoculation of this organism into animals that it does not produce urinary infections. They have, however, proved that the cocci are responsible. Mixtures of colon and coccidial infections are known to exist in animals. The source of these organisms is always a question of vital importance, but often not easy to find.

The easiest way is by what is known as selective culture media. The dog's own blood is added to glucose brain broth and then to the sample of urine to be cultured. After 24 hours of incubation the cultures are examined and if growth of bacteria occurs, they are considered pathogenic for that particular dog. This technic is described in detail in the book of Kolmer and Boerner. In our hands the use of such tests to determine the pathogenicity of the organisms found in urine has not met with much success. There are serological tests for agglutinins and precipitins and they are helpful in determining and isolating the offending organism.

In a series of cases the following were determined.

Colon organisms with pus.....	35%
Colon organisms with no pus.....	15%
Staphylococci with pus.....	35%
Staphylococci with no pus.....	70%
Streptococci with pus.....	10%

PROSTATITIS

There is a question in my mind as to whether or not this condition occurs as a primary focus. I should like to consider it as a manifestation of a generalized infection of the dog.

We see many cases of hypertrophy of the prostate, especially in old dogs and in some young male dogs that have been used excessively as breeders or that have made numerous attempts at service but have failed to complete the act.

Dogs affected in this manner usually are presented with an elevation of temperature, walk with a stiff gait and arched back and

show extreme restlessness or fatigue. We often have wondered just how much massage of the prostate benefited these dogs. O'Connor has stated:

1) A dog's prostate removed six hours after gentle massage showed areas of hyperemia scattered throughout the gland, with desquamation of the epithelial cells lining the alveoli.

2) A dog's prostate removed 16 hours after gentle massage showed a moderate amount of round cell infiltration in the septa separating the alveolar spaces, denoting what appeared to be a slight chronic inflammatory reaction.

3) A dog's prostate removed after daily massage for three consecutive days showed a denuding of the epithelial lining of the alveoli, a rupture of many of the septa and in other areas a crowding together of the alveolar walls. In several areas there was a very marked and dense round cell infiltration separating the alveolar space.

4) A dog's prostate removed after daily massage for seven days showed many areas of rupture of the alveolar walls together with scattered cystic formations. There also were areas of round cell infiltration denoting glandular destruction and chronic inflammation.

Ladd and O'Connor found that the trauma of simple needling of the normal dog prostate is followed by an inflammatory reaction with considerable subsequent fibrosis and glandular destruction.

Chemistry of the Prostatic Secretion.—Hirohona obtained prostatic secretions from dogs by electrical manipulation. This secretion quickly activated sperm. He attributed this action to the mineral content of the fluid and its alkalinity, which result in a specific substance. Winkler states that the subcutaneous injection of prostatic fluid into the dog results in a condition of sexual excitation with erection of the penis. The injection of small amounts produces atrophy of the testicles. Other investigators failed to obtain these results.

Uncontaminated prostatic secretion in the dog is a clear, colorless fluid having a slightly acid reaction—pH 6.8—and containing a small amount of fatty acids and phosphorus.

Treatment.—In treating acute prostatitis we have found that massage does not

seem to be of much benefit; therefore, we resort to the intravenous injection of 31 gr. of sodium iodide in 10 cc. of triple-distilled water, repeated every three or four days if the condition does not subside.

The following are some drugs which are excreted by the prostate gland. The dosage and methods of administration are given:

Neutral acriflavine, 1 per cent solution, intravenously

Gentian violet, 7.5 gr., by the mouth

Mandelic acid, intravenously

Urotropin, 31 gr., intravenously

Urotropin, 8 tablets, 5 gr. each, by the mouth

Sodium and potassium iodine, intravenously

Methylene blue, 7.5 gr., 1 per cent solution, intravenously

Phenolsulfothalein (dye), intravenously

Sulfanilamide, 5 gr. every four hours, by the mouth

These drugs do not appear to enhance the bactericidal action of the prostatic fluid.

TEETH

Infection about the apices of the teeth is not, as a rule, a common source of focal infection in the dog, but it does occur frequently in the cat.

Changing the diet of pet animals and feeding of certain types of food has resulted in much more dental trouble than formerly was the case. It is true that dogs do not masticate their food before swallowing it. The ingestion of soft, mushy food material has resulted in many decayed teeth. I believe we see many more cases of broken teeth than previously; perhaps this is due largely to the motor car, while rocks, sticks and other objects result in loosened and broken teeth.

All of us are familiar with abscess formation at the roots of the fourth premolars which results in necrosis of the bone of the maxillary sinus just in front of the eye.

For the sake of simplicity we shall classify two types of dental sepsis—the open and the closed. The open type pours the bacteria and their toxins into the oral cavity. These later are swallowed and enter the stomach, where most of them are destroyed by the action of the hydrochloric

acid produced by the glandular portion of the stomach. This is known as the gastric germicidal barrier. The bacteria are destroyed and the toxins are neutralized.

In the case of the closed type the sepsis acts directly on the blood and lymph streams. In order to combat this type we must have some resistance, such as phagocytosis. Without this resistance, infection occurs depending, of course, upon varying degrees of either natural or acquired susceptibility, immunity, and varying degrees of virulence of the microorganisms. The organism found most commonly is the streptococcus.

In 1932, Jones and Newsom did some work with dogs in an attempt to show the results of focal dental infection on the heart. Twelve dogs had the distal half of a tooth removed. After the pulp was removed and the cavity dried, it was filled with a culture of a streptococcus obtained from a case of sinusitis. The top of the tooth was then filled with silver.

The inoculated and control dogs were then subjected to exercises which were carried to the point of exhaustion. The results indicated that the inoculated dogs showed more fatigue, lost more weight, the average duration of life was shortened and they were made chronically ill by the inoculation on account of their dental infection. They concluded from this observation that dental abscesses were demonstrated in all the inoculated dogs and the hearts all showed pathological changes. These results, which were so definitely controlled, must be regarded as distinctly suggestive of selective tissue affinity or elective localization.

Rosenau took cultures of *S. albus* and planted these in the anterior vital teeth of dogs. After a period of time he extracted the teeth and recovered these organisms in the pulp canals and at the apices of other nonvital teeth in sites which had not been experimentally contaminated. From this it must be concluded that teeth are affected metastatically by bacteria if these bacteria gain entrance to the general circulation.

Among the most common conditions associated with dental sepsis in the dog are gastrointestinal disorders which often appear as the primary cause of the trouble.

SKIN

Focal infections of the skin may be classified under three main headings:

- 1) cutaneous disorders which may act as foci of infections;
- 2) cutaneous disorders in which focal infections may be important factors; and
- 3) cutaneous disorders which result in systemic diseases.

Focal infection plays a double rôle in that skin disorders may act as foci of systemic infections and focal infection may be an important causative factor in diseases of the skin.

Treatment.—Specific immunization and desensitization constitute an important method of changing the reaction of the animal to infection in cases in which removal of the focus (as the skin) can not be achieved because the animal is already desensitized to the bacteria invading the skin.

With this in mind in treating with bacterins conditions of the skin which are invaded with bacteria, one should remember that the subcutaneous method of administration does not desensitize but, rather, produces a condition of hypersensitiveness. On the other hand, the intravenous administration of these stock, or autogenous, bacterins not only desensitizes the dog but confers a much higher degree of immunity as measured by the agglutination titre of the blood.

Immunity resulting from such a procedure, therefore, is specific immunity and not a result of nonspecific protein. The first step in intravenous therapy should be the inoculation of a small amount of the product into the skin (intradermally). After 24 hours have elapsed the above should be repeated every three days. The dosage is gauged somewhat by the intensity of the reaction, but this reaction is to be expected and desired. The dose should be doubled each time until a slight reaction occurs; then it should be increased gradually.

ANAL GLANDS

The anal glands of the dog are defined as "acinas glands." They normally secrete a yellowish brown fluid which is supposed

to lubricate the feces during passage through the anus. This secretion has a rather unpleasant odor and an acid reaction. The glands are located between the anus and the mucous membrane of the rectum and are about the size of a small marble when not infected; each gland has a duct which acts as a canal for the passage of the secretion. Each duct opens as a small papilla on the mucous membrane of the rectum.

Because the openings of these ducts are directed inward in a direction opposed to the normal fecal current, irritating particles, such as food material, bits of bone, hair and other foreign material are forced into these ducts during the expulsion of fecal mater, and also from sliding the rectum along the rug on the floor or on the grass in the yard.

When material becomes lodged in the ducts, it acts as a foreign body irritant and causes occlusion, resulting in suppuration and absorption of the toxic material in the glands. The glands then become natural incubators and fertile sources of infection. They probably are the most frequently overlooked source of focal infection present in the dog. Therefore, all veterinarians should include a thorough examination of these glands when dogs are presented for examination and treatment.

Local Symptoms.—When infected, the glands become hot, red, swollen and extremely painful. Irritation is almost constant. The dog tries to lick the hind parts and rubs the parts along the floor or ground. Oftentimes these glands become abscessed and these abscesses later rupture, producing an open wound.

Systemic Symptoms.—There is no question that many dogs suffer from focal infections in the anal glands and, after some of the foci are removed, have an apparent recurrence of symptoms after a period of temporary relief. We have all seen these glands become reinfected. Severe constipation usually results in the absorption of toxins from the digestive tract as well as from the foci of infection. We often have seen dogs in convulsions as a result of this.

Lameness of one or both legs with later

paralysis of the hind quarters is not uncommon. Muscular pain is often present, perhaps due to neuritis and autointoxication. Those of us who have had our attention called to intestinal tract infections have been struck with the similarity shown by the symptoms which are designated as autointoxication and those symptoms which we now understand as of focal infective origin often found in the anal glands.

Treatment.—If the glands are suppurative, it is advisable to open and drain them from the outside. We find that if it is possible to remove the material by squeezing the area and draining it out through the natural duct, it is advisable to do so, because of the unsightly appearance of the outside opening. We pack them, if necessary, with any bland ointment and find that they heal rather rapidly. If corrective treatment has failed, complete removal of the gland should be undertaken. High rectal enemas also may be beneficial.

EYE (CORNEA)

The cornea, because of its location, is subject to external injury and infections more than to infections from within the body.

I know of no condition in the dog more disagreeable to treat than corneal ulcers. The veterinarian attempts to obtain a cure without a blind eye while the dog produces more irritation with its claws or by rubbing the affected eye on the floor or other object.

The type of corneal ulcers about which I wish to speak are those produced as a result of endogenous origin, and are of bacterial invasion.

Some appear on the surface of the cornea, others within the layers. Those on the surface stain well with fluorescein while the foci within the layers of the cornea appear first as small, red, pin-point spots, the results of hemorrhage and possibly necrosis produced either by toxins or bacteria from foci of infection. In these cases we usually find staphylococci and streptococci.

BACTERIAL TOXEMIAS IN GENERAL

The rôle of focal infection is generally recognized in the causation of systemic dis-

eases, but what is not so well known is that the toxins liberated by the bacteria in a focus of infection may, without producing pathological changes, give rise to symptoms similar to those occurring in organic diseases. For example, the symptoms of acute hemorrhagic tonsillitis in the dog may stimulate acute distemper, both manifesting respiratory symptoms, such as fever, cough, loss of appetite, chilling, inflamed conjunctiva and a watery discharge from the nose.

The symptoms of gastrointestinal disturbances are vomiting, loss of appetite and either constipation or diarrhea. The neurologic picture is always one that taxes the ability of the examining veterinarian because of the following symptoms: nervousness, irritability, diminished power even to the extent of paralysis in one or more legs, twitching of groups of muscles and even convulsions. Urticaria also must be included in the skin symptoms of bacterial toxemia, of which dermatitis and eczema are the most common.

Diagnosis.—The diagnosis of bacterial toxemia without coexisting systemic disease is based on the history and the finding of the focus of infection containing the bacteria which are capable of infecting the dog, and the inability to find any other cause for the symptoms.

Differential Diagnosis.—A peculiar characteristic of bacterial toxemia is the failure of medication to influence the symptoms. If you will think this over I am sure you will recall some cases in your practice where this was a fact.

Disappearance of symptoms following removal of the focus of infection is the best supporting evidence.

Do not confuse bacterial toxemia with lack of vitamins.

Treatment.—The treatment of bacterial toxemia consists of the complete removal of the foci of infection, which includes the destruction of the infecting organisms and the neutralizing of their toxic products.

Foci of infection in the lower respiratory, gastrointestinal and urinary tracts require special treatment, but as most of these are

(Continued on page 253)

Preliminary Report on the Propagation of the Fowl-Leucosis Virus on Chick Embryos by Intravenous Inoculation*

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FEW ATTEMPTS to propagate the virus of fowl leucosis on the chick embryo are reported in the literature.

Storti and Mezzadra¹ reported the successful cultivation of the virus of avian leucemia on the developing chick embryo. They used the chorioallantoic route of inoculation exclusively and emphasized the complete absence of leucemic lesions both in the chorioallantoic membrane and in the visceral organs of the embryo. They asserted that these lesions are not a prerequisite for the presence of the infective agent. They inoculated 61 chick embryos with leucemic blood on the chorioallantoic membrane and, after 4 to 15 days of incubation, 20 carried the virus as indicated by the inoculation and infection of chicks.

Van den Berghe and d'Ursel,² inoculating the chorioallantoic membrane of a few embryos, obtained results similar to those of Storti and Mezzadra except that the chicks inoculated with infected embryo tissues developed paralysis and erythroblastosis.

In contrast to the results noted above, the authors, using the intravenous technic described by Eichhorn,³ obtained marked lesions in the embryos which became infected. Chick embryos 11 days of age were inoculated intravenously with .05 cc. of heparinized leucemic chick blood. Daily examination of blood smears from the inoculated embryos was made after a few days of incubation. The appearance of increasing numbers of hemocytoblasts in the peripheral blood indicated the onset of leucosis. The disease developed in the embryo in six to eight days after inoculation, at which time

the embryo became morbid or died. Embryo infection was confirmed in every case by inoculation of susceptible chicks with embryo blood. These chicks then developed typical cases of leucosis in about the same time as those inoculated with leucemic chick blood. Approximately 3.5 per cent of embryos inoculated with leucotic chick blood developed leucosis. Two groups of embryos came down with leucosis when inoculated with second-passage embryo blood.

Both macroscopic and microscopic lesions were noted in the tissues of infected embryos. Macroscopically the livers and spleens were enlarged and a variable number of pin-point gray foci were seen in the spleen and sometimes in the liver. Microscopic lesions consisted of lymphoid infiltration of the liver, spleen and kidneys along with the presence of hemocytoblasts in the blood. This infiltration was similar to that seen in chicks infected with leucosis except that it was usually less intense.

Susceptibility of the embryo to leucosis was the same whether the eggs came from a susceptible or a resistant strain of fowls.

Serial passage of the virus through the chick embryo causes a marked decrease in infectivity, as in only two instances did second-passage embryos become leucemic. It appears that the virus must be adapted for serial passage in chick embryos.

Silage Odor

If common soap and water will remove the odor on the hands caused by the handling of silage, it is an indication that the silage has undergone the right kind of fermentation, but if an unpleasant odor lingers after such a washing, the cause is an undesirable butyric acid fermentation instead of the desirable lactic acid fermentation.—*From the Bureau of Dairy Industry, USDA.*

*From the Animal Disease Station, Bureau of Animal Industry, U. S. Department of Agriculture.

¹Storti, E., and Mezzadra, G.: Tentatives de culture du virus de la leucemie des poules dans la membrane chorio-allantoide. (Note preliminaire.) *Le Sang*, xli (April 5, 1938), pp. 533-539.

²Van den Berghe, L., and d'Ursel, F.: *Compt. Rend. Soc. Biol.*, cxxxi (May 1939), pp. 1301-1304.

³Eichhorn, E. A.: In press.

Tests with Miscellaneous Substances for the Removal of Tapeworms from Chickens*

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LARGELY on the basis of clinical evidence various preparations have been recommended for the treatment of tapeworm-infected poultry. However, critical experiments have shown that no substance or mixture of substances is known which will effectively remove more than one or possibly two of the eight species of tapeworms found in chickens in the United States. Accordingly, the present experiments were undertaken for the purpose of investigating the anthelmintic properties of various substances with a view to developing a satisfactory poultry taeniocide.

HISTORICAL DATA

The following substances have been recommended largely on the basis of clinical evidence as being effective for the removal of tapeworms from chickens: areca nut (43, 51†), arecoline hydrobromide (39), aloes (43), carbon tetrachloride (30, 31), colloidal iodine (6, 10, 11, 12, 13, 18, 32), 2 per cent aqueous solution of copper sulfate (39), kamala (3, 5, 7, 18, 23, 29, 32, 37, 39, 43, 44), lye-grain mixtures (2, 20), male fern (26, 43, 51), pomegranate root bark (44, 51), pumpkin seeds (43), tetrachlorethylene (30, 31), thymol (1), turpentine (4, 16, 29, 43, 44), as well as mixtures of such substances as arecoline hydrobromide and tetrachlorethylene (8), "Black-leaf 40" and kamala (6), carbon tetrachloride and male fern (39), male fern, turpentine and castor oil (9), nicotine sulfate, Lloyd's alkaloidal reagent and kamala (6), oil of chenopodium and castor oil (17), turpentine, oil of chenopodium, thymol and cottonseed oil (27), and turpentine and castor oil (32).

Substances reported by various investi-

gators as possessing little or no value for the removal of poultry tapeworms are as follows: arecoline hydrobromide (3, 23), areca nut (47, 22, 19), colloidal iodine (21, 40, 41, 42, 45), *Carica papaya* seed (19), kamala (21, 24, 33, 34, 35), aqueous solution of lye (3), lye-grain mixtures (36), oil of chenopodium (22), pomegranate root bark (16, 47), santolin (16), thymol (47), tetrachlorethylene (38), turpentine (22), tobacco mash (15, 22), and mixtures of eserine sulfate and pilocarpine hydrochloride (3), carbon tetrachloride and fresh coconut oil (19), turpentine and olive oil (14), tetrachlorethylene and kamala (45), and male fern and calomel (39).

Wright (48), and Wright and Van Volkenberg (50), reported that gentian violet in doses of 4, 6, 8, and 10 gr. removed all the specimens of *Raillietina tetragona* from five birds; azamine in doses of 4.4 to 11 gr. removed all specimens of *R. tetragona* from three birds but failed to remove any of the same parasites from another bird; mercurochrome 220 soluble, in a dose of 15 gr., removed 71.4 per cent of the *R. tetragona* from one bird but failed to remove any from another bird.

Wright and Van Volkenberg (49) reported that brilliant green in doses varying from 5 to 15 gr. was toxic to chickens but was effective for the removal of *R. tetragona* and a *Raillietina* sp. from chickens; this treatment was ineffective for the removal of *Davainea proglottina*, *Hymenolepis cantaniana* and *Amoebotaenia sphenoides*. Underwood, Harwood and Schaffer (46) reported that brilliant green sulfate in doses of 150 to 400 mg. was fatal to nine out of twelve birds; at this dosage rate one specimen of *Choanotaenia infundibulum* and most of the *R. tetragona* present were removed, but 28 *R. cesticillus* were apparently unharmed by the treatment.

Levine (28) in a series of critical ex-

*From the Zoölogical Division, Bureau of Animal Industry, U. S. Department of Agriculture.

†The numbers in parentheses refer to references cited.

periments tested the following drugs on chickens experimentally infected with *D. proglottina*: areca nut, arecoline hydrobromide, beta naphthol, carbon tetrachloride, colloidal iodine, hexylresorcinol, kamala, male fern, oil of chenopodium, pelletierine tannate, rotenone, santonin, tetrachlorethylene, thymol, turpentine, mixtures of areca nut and kamala, and several proprietary remedies, but none of these substances was found to be of any value. This author was not able to prevent experimental infestation with *D. proglottina* using 2 per cent tobacco dust in the feed and copper sulfate in the drinking water.

MATERIALS AND METHODS

The tests reported in this paper were conducted on both naturally and experimentally infected chickens. The naturally infected birds were purchased at various markets in and around Washington, D. C. Those used for the experimental infections were obtained from the poultry section of this bureau's animal husbandry division as one-day-old chicks and raised under conditions designed to prevent extraneous infection with helminths.

Meal beetles (*Tribolium* spp.) were fed on the gravid segments of *R. cesticillus*, and after a period of four to five weeks mature cysticercoids were removed from these beetles by the method outlined by Horsfall (25). At 5 to 6 weeks of age, each parasite-free chick was given by the mouth a definite number of these cysticercoids. Two weeks or more after infection, each bird was confined in a separate compartment of a laying battery having a wire floor through which the droppings passed into a pan containing a small amount of water. The drugs were administered in gelatin capsules after a fast of 18 hours. Four hours after treatment the birds were given their regular feed. Each bird was weighed periodically from the time of treatment until autopsy. The feces were collected each day for the first four days following treatment and examined in the usual manner. Two weeks after treatment the birds were killed and carefully examined for tapeworms, and for any

pathological condition which could be attributed to the treatment used.

Essentially the same procedure was employed in the treatment of the naturally infected chickens.

EXPERIMENTAL RESULTS

The following substances were tested by J. R. Bozicevich, formerly of this bureau, on chickens naturally infected with various species of tapeworms, but were found to have little or no promise as taeniocides:

Anabasin, anabasin bentonite, anethole, aniline blue, aniline hydrochloride, anisole, arecoline hydrobromide, aurantia (ammonium salt of hexanitrodiphenylamine), abietic acid, acreolin, acreolin in 33 per cent alcoholic solution, allylic alcohol, "Bayer 205," benzidine, benzyl alcohol, benzoyl benzoic acid, benzylphenylhydrazine hydrochloride, n-butylchloride, butyl lactate, dibutyl tartrate, n-butyl carbinol, carbon disulfide, catechol, n-caprylic acid, oil of chenopodium, p-chlorothymol, o-chlorotoluidine, codeine peat, p-cresylmethylether, o-cresylmethylether, cyclohexanol, p-cyclohexylphenol, 2,4 dichlorophenol, copper sulfocyanate, embelin, ethylenediamine peat, n-heptyl alcohol, hexylchlorophenol, hexylresorcinol, kamala extract (water-soluble potassium salt), *Lupinus saxonus*, malic acid, mercuric chloride, methyl blue, naphthylamine, nicotine, nicotine bentonite, nicotine peat, nicotine silicotungstate, nicotine tannate, novarsenobenzol, oleoresin male fern, palmitic acid and diphenylamine (mixture), palmitic acid, p-tertiary-amyphenol, piperidine peat, p-aminophenol, pelletierine tannate, phenylthiocarbazide, phenolsalicylate, p-phenylphenol, phloroglucinol, picric acid, pine oil, pyridine, pyrethrum, quassia powder, isoquinoline silicotungstate, rotenone, saponin, sassafras oil, sodium oleate, sodium tetrachlorophenate, spirit blue, sulfur bentonite, sulfur peat, tartar emetic, thymol, trematol, trichlorofluoroethane, 2,4,6-trichlorophenol, trichloroacetic acid, trichlorethylene, triethanolamine, trisodium phosphate, turpentine, and "Wesson salts."

Various extracts of *Actinea odorata* gave encouraging results in a few cases but were eliminated on further testing because the extracts were extremely toxic for the host and proved difficult to standardize. Synthetic pelletierine hydrochloride in tests performed by the writers at dose rates varying from 50 to 300 mg. per bird removed all specimens of *R. tetragona* from five chickens, but it was ineffective for the removal of *R. cesticillus*.

From one to six chickens infected experimentally with twelve cysticercoids each of *R. cesticillus* were employed by the writers in tests with each of the following substances, which exhibited no promise as taeniocides for use in poultry:

a) *Inorganic Substances*.—Aluminum acetate, aluminum acetoglycerinate, aluminum acetotartrate, aluminum benzoate, aluminum borate, aluminum chloride, aluminum chromate, aluminum citrate, aluminum oleate, aluminum oxalate, aluminum palmitate, aluminum sulfocarbolate, aluminum silicofluoride, aluminum tannate, cobalt chloride, cobalt hydroxide, cobalt nitrate, cobalt oxalate, cobalt phosphate, cobalt stannate, cobalt sulfate, cobalt ammonium sulfate, iron cacodylate, lead formate, lead borate, lead oleate, mercuric oleate, copper oleate, sodium cobaltic nitrite, sodium selenite, selenous acid, sodium sulfate, peanut oil green, and sulfoleate green.

b) *Synthetic Organic Chemicals*.—Acetyl-diethylamine, allylamine, allylthiourea, 2-amino-5-azoanizole, p-aminoacetophenone, p-aminobenzenesulfonylamide, 2-amino-p-cymene, amino-3-5-diiodobenzoic acid, 4-amino-1-3-dimethylbenzene, anthracene, arsenilic acid, azobenzene, Bayer 205, benzil, benzene, benzene-o-cresol, benzeneazodiphenylamine, benzeneazoresorcinol, benzophenone, brucine butyl chloride, 2-chloro-o-phenylphenol, coumarin, cupferron (nitrosophenylhydroxylamine ammon.), desoxybenzoin, dibenzothiophene, dichloroaniline, sodium diethyldithiocarbamate, dimethylamidoazobenzol, p-dimethylaminobenzaldehyde, dimethylgloxime, dinitrobenzene, 3-5-dinitro-o-cresol, dipicrylamine, ethylaminobenzoate, p-ethoxydiphenyl, fluorine, formyl-diphenylamine, p-hydrazobenzene, p-hydroxybenzophenone, hydroxyphenothiazone, iodoform, iodoformin, malachite green oxalate, mercaptobenzothiazole, methylanthraquinone, beta-naphthylamine, 4-oxy-3-acetylaminophenylarsonic acid-N-methyltetrahydropyridine-B-carbonic acid methyl ester (the drug used in this instance was a proprietary taeniocide marketed under the name "Nemural"), o-nitroaniline, nitrobromobenzene, p-nitrochlorobenzene, 1-nitro-2-naphthylamine, m-nitrophenylarsonic acid, nitrophenyl-1-naphthylamine-8-sulfonic acid, p-nitrophenotole, paraformaldehyde, phenylbenzothiazole, phenylthiohydantoic acid, phenyl-a-naphthylamine, diphenyl, diphenylamine, diphenylguanidine, triphenylguanidine, diphenylthiocarbazide, diphenylnitrosoamine, s-diphenylthiourea, p-phenylenediaminedihydrochloride, piperonal, tetramethylthiouramdisulfide, tetramethyldiaminodiphenylmethane, thioacetanilidae, thiophene, thiosinamine, trihydroxyethylamine stearate, triethanolamine, trimethamine hydrochloride, and xanthone.

c) *Plant Products*.—Brucine, croton oil, del-

taline, oil of *Artemisia annua*, oil of blue-curls oil of catnip, oil of dog fennel, oil of *Erigeron*, oil of goldenrod, oil of *Ocimum canum*, oil of Virginia red cedar (light), oil of summer savory, oil of thyme, oil of *Pyncnanthemum albescens*, pomegranate root bark, pyrethrum, rottlerin, sassafras oil, aqueous extract of *Spigelia marilandica*, oil of St. Johnswort, and oil of wormwood.

d) *Mixtures*.—Bordeaux mixture, brucine and colchicine, brucine and olive oil, carbon disulfide and mineral oil, castor oil and oil of chenopodium, castor oil and chloroform, deris resin and olive oil, hydroxyphenothiazone and brucine, kamala and synthetic pelletierine hydrochloride, lye-grain mixture, phenothiazine and butyric acid, tetrachlorethylene and thiophene, tetrachlorethylene and arecoline hydrobromide, rotenone and olive oil, rotenone and peanut oil, sassafras oil and oil of cloves, sassafras oil and thiophene, sassafras oil and castor oil, sassafras oil and oil of wormwood, and oil of wormwood and synthetic pelletierine hydrochloride.

More encouraging results were obtained following the administration of inorganic arsenic compounds. The results obtained from experiments with these compounds on chickens, each of which was infected experimentally with twelve cysticercoids of *R. cesticillus*, are given in table I. All arsenic compounds except the lead salt were eliminated from further consideration because of toxicity. Since the results indicated that lead arsenate was reasonably effective in birds infested with small numbers of tapeworms, it was deemed advisable to determine the percentage of efficacy where the birds were more heavily parasitized. Accordingly, 50 cysticercoids of *R. cesticillus* were administered to each of several chickens; these birds were divided into two groups, one of which was treated and the other used as a control.

The results obtained from the administration of 0.3-Gm. doses of lead arsenate to 40 chickens infected with 50 cysticercoids of *R. cesticillus* each are shown in table II. The percentage of efficacy obtained from this treatment indicates a significant taeniocidal value for lead arsenate. The treatment was not completely satisfactory, however, in that the rate of growth of five out of the 40 birds treated was greatly retarded and in the case of two additional birds there was a loss of weight

TABLE I—Effects of lead arsenate on artificial infestations of *Raillietina cesticillus* in chickens.*

BAND NO. AND BREED†	WEIGHT (Gm.)	DATE OF INFECTION	DRUG EMPLOYED	DOSE (Gm.)	DATE OF TREATMENT	DATE OF NECROPSY	NO. TAPEWORMS RECOVERED AT NECROPSY	EFFECT ON HOST
		(1938)			(1938)	(1938)		
1039 RI	556	6/14	Copper arsenate	0.1	6/29	6/30	2	Died
1131 RI	431	6/14	Copper arsenate	0.5	6/29	7/8	0	Toxic
1459 RI	1084	5/15	Copper arsenate	0.5	5/31	6/1	0	Died
1132 RI	589	6/27	Copper arsenate	0.075	7/11	7/25	0	None
1136 RI	769	6/27	Copper arsenate	0.075	7/11	7/18	0	Died
1162 RI	416	6/27	Copper arsenate	0.075	7/11	7/18	0	Died
1580 RI	228	7/10	Copper arsenate	0.025	7/25	7/26	3	Died
			Corn starch	0.075				
1533 RI	441	7/10	Copper arsenate	0.025	7/25	8/9	8	None
			Corn starch	0.075				
1592 RI	408	7/10	Copper arsenate	0.025	7/25	8/9	5	None
			Corn starch	0.075				
1599 RI	374	7/10	Copper arsenate	0.025	7/25	7/26	1	Died
			Corn starch	0.075				
1504 RI	282	7/10	Copper arsenate	0.025	7/25	8/9	0	None
			Corn starch	0.075				
1584 RI	292	7/10	Copper arsenate	0.025	7/25	8/9	3	None
			Corn starch	0.075				
		(1939)			(1939)	(1939)		
922 LS	1380	7/22	Barium arsenate	0.3	8/14	8/28	0	Lost weight
1152 RI	2000	9/13	Barium arsenate	0.5	10/6	10/18	0	Died
1817 M	1025	4/22	Barium arsenate	0.6	8/17	8/17	7	Died
1959 M	1225	4/11	Barium arsenate	1.0	8/17	8/28	0	Died
118 RI	1100	3/22	Calcium arsenate	0.5	4/24	4/26	0	Died
3871 M	555	4/11	Calcium arsenate	0.2	4/28	4/29	1	Died
			Aluminum tannate	1.0				
1963 M	448	4/11	Calcium arsenate	0.1	5/9	5/10	0	Died
			Aluminum tannate	0.5				
1726 M	1255	4/22	Calcium arsenate	0.250	8/14	8/28	0	Lost weight
			Gum tragacanth‡	0.6				
1870 M	725	4/22	Cobalt arsenate	0.3	7/21	7/30	0	Died
1939 M	475	4/11	Lead arsenate‡	0.005	5/15	5/29	1	None
1932 M	415	4/11	Gum arabic	0.1	5/15	5/29	6	None
1914 M	490	4/11	Gum arabic	0.15	5/15	5/29	0	Lost weight
1942 M	475	4/11	Gum arabic	0.2	5/9	5/23	0	Lost weight
1990 M	542	4/11	Gum arabic	0.25	5/15	5/29	3	None
1936 M	525	4/11	Gum arabic	0.25	5/9	5/23	0	Lost weight
1272 M	525	4/11	Gum arabic	0.25	5/9	5/23	12	Lost weight
150 RI	1020	3/22	Gum arabic	0.5	4/24	5/8	0	Lost weight
1957 M	995	4/11	Lead arsenate C. P.	0.3	9/6	9/20	0	None
1222 RI	1075	9/13	Lead arsenate C. P.	0.3	10/4	10/18	6	Lost weight
			Gum arabic	0.2				
181 RI	856	3/22	Magnesium arsenate	0.5	4/24	4/25	5	Died
2000 M	420	4/11	Magnesium arsenate	0.2	4/28	5/12	0	Lost weight
			Aluminum tannate	1.0				
1958 M	468	4/11	Magnesium arsenate	0.1	5/4	5/18	3	Lost weight
			Aluminum tannate	0.5				
1982 M	450	4/11	Magnesium arsenate	0.1	5/4	5/18	5	None
			Aluminum palmitate	1.0				
1955 M	991	4/22	Magnesium arsenate	0.15	5/9	5/23	0	Lost weight
			Aluminum palmitate	0.5				
1739 Lh	991	7/22	Mercuric arsenate	0.25	8/25	8/25	7	Died

*These birds were infected with 12 cysticercoids each.

†The breeds are indicated by the letters following the band number. LS = Light Sussex; RI = Rhode Island Red; M = Mixed; Lh = Leghorn.

‡This material was a proprietary mixture containing a small amount of gum arabic.

TABLE II—Effects of inorganic arsenicals on artificial infestations of *Raillietina cesticillus* in chickens.*

BREED	NO. OF BIRDS IN EXPERIMENT	DATE OF INFECTION (1939)	MEAN WEIGHT AT TIME OF TREATMENT (Gm.)	DATE OF TREATMENT (1939)	MEAN GAIN (+) OR LOSS (—) OF WEIGHT DURING 4 DAYS FOLLOWING TREATMENT (Gm.)	DATE OF NECROPSY (1939)	TAPEWORMS RECOVERED AT NECROPSY (AVERAGE NUMBER)	EFFICACY OF TREATMENT (PER CENT)
Mixed	10 (+)	5/15	502.6	6/5	— 3.9	6/19	0	100
Mixed	5	5/15	405.4	()	+ 86.8	6/19	26.8 ± 3.01	
Light Sussex	10 (+)	6/21	1136.8	7/25	— 11.5	8/8	1.7 ± 3.8	96.2
Light Sussex	10	6/21	1078.7	()	+ 157.8	8/8	18.6 ± 1.1	
R. I. Red	10 (+)	8/16-19	1125.3	9/27	+ 81.6	10/11	2.3 ± 1.3	75
R. I. Red	10 (±)	8/16-19	1126.5	9/27	+ 84.9	10/11	2.9 ± 2.8	68.4
R. I. Red	10	8/16-19	884.3	()	+ 179.7	10/11	9.2 ± 2.8	

* These birds were infected with 50 cysticercoids each.

(+) Each bird was treated with 0.3 Gm. of lead arsenate containing gum arabic as a deflocculator.

(±) Each bird was treated with 0.3 Gm. of chemically pure lead arsenate.

() Control—no treatment given.

extending over a period of two weeks. At necropsy various stages of necrosis of the liver were noted in these seven birds. Some of the remaining birds showed a temporary loss of weight or a decreased rate of growth as compared with the controls, but at the end of two weeks all had recovered completely.

DISCUSSION

From the data presented in table I, it is evident that arsenic compounds possess taeniocidal properties but that they are also toxic to the host. The two samples of lead arsenate were the only arsenicals tested which could be administered to chickens with any degree of safety. Experiments to determine the toxicity of lead arsenate containing a deflocculator indicated that chickens weighing 1,500 Gm. (3 lb., 2 oz.) or more withstood a dose of 1 Gm. without deleterious effects. The same dose of the chemically pure substance was attended by some fatalities. However, it was noted that in some birds a necrosis of the liver developed after the administration of rather small doses of lead arsenate. This condition was present in only a few birds but was sufficiently severe to render the treatment undesirable. Since some birds are adversely affected by the treatment the writers feel that lead arsenate should not be used as a poultry taeniocide unless the birds are severely affected by tapeworms and some treatment is imperative. In any case the treatment should be administered under the direction of a veterinarian.

SUMMARY AND CONCLUSIONS

Of the 223 substances and 27 mixtures tested experimentally as anthelmintics for the removal of tapeworms from chickens, only lead arsenate exhibited any promise as a poultry taeniocide.

In carefully controlled tests in which chickens experimentally infected with *Raillietina cesticillus* were used, it was found that lead arsenate in effective doses is too toxic to be recommended for general use as a poultry taeniocide.

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—Bacterial Foci

(Continued from page 246)

secondary to the primary focus in the upper respiratory tract, they may disappear when it is removed.

CONCLUSIONS

The manner and time of treatment of a focus depend upon the judgment of the veterinarian. As a rule, however, the course to pursue is proper drainage at the proper time, if possible, and the institution of such measures as will improve the health of the animal by care and feeding. This method will favor decreased susceptibility to the effects of the organisms or their toxins, or both.

No defense is needed for the theory of focal infection. No one can deny that by means of defocalization many recoveries have been effected in conditions that resisted other treatment.

Hybrid Corn for Cattle

In feeding trials conducted at the University of Illinois with Station Dent (harvested in 1937), Station Dent (harvested in 1939) and Hybrid, Illinois 784 (harvested in 1939), the returns per bushel of corn fed were all in favor of the hybrid corn. The hybrid corn returned 77 cents per bushel; Station Dent (1937), 69 cents; and Station Dent (1939), 72 cents.

In regard to palatability, the hybrid corn was first. With the average time required to eat 8 lb. of shelled corn as a basis, 25.5 minutes was required for the Station Dent (1937), 16.7 minutes for the hybrid (1939) and 14.8 minutes for the Station Dent (1939). The test heifers left 26 per cent of the Station Dent (1937) in the feed bunk. In the other two lots the heifers ate up all of the 8 lb. given them for the test. It also was reported that hybrid corn yielded a superior silage.

Some Diseases of the Eye of Animals. II*

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A THOROUGH examination of the eye and its accessory structures is important when one attempts to establish the diagnosis of diseased conditions in these parts. Several methods are open to the practitioner, and it is usually necessary to use two or more of them in combination in order to obtain accurate information. The procedures usually followed are:

1) *Naked eye examination* (with or without direct illumination). This method is applicable to a study of the lids, conjunctiva, lacrimal apparatus, cornea, sclera and, in a cursory way, the aqueous, iris and lens.

2) *Lateral illumination*. Corneal opacities, disturbances of the aqueous humor, anterior capsular opacities, and changes in the iris and anterior chamber in general may be brought out more readily by this method.

3) *Focal illumination*. Data regarding the size, location and nature of foreign bodies and opacities can be obtained effectively by using a point of light brought to a focus on a specific point through the use of a lens.

4) *Ophthalmoscopic examination*. When properly handled, the ophthalmoscope is an invaluable instrument in the study of ocular pathology. It is the only means by which intraocular changes can be studied, and therefore indispensable in the diagnosis and treatment of diseases of the eye. Notes on the use of this instrument appear in all standard textbooks on ophthalmology, but it is only through practice that skill can be attained.

DISEASES OF THE LIDS AND CONJUNCTIVA

Ptosis is a condition in which the palpebral fissure is decreased in size due to a "dropping" of one or both lids. It may be

either a true or pseudo-ptosis. The former is a condition in which the lids droop as the result of an interference with the nervous innervation to the lids. In this condition the lid can not be raised, even with the greatest effort on the part of the individual. Pseudo-ptosis, on the other hand, is usually the result of an inflammatory process, and the lids droop because of the resultant edema which greatly increases their weight. Hot applications and removal of the cause usually bring about an improvement in the condition.

Lagophthalmus, or inability to close the lids, sometimes occurs in dogs and is due to a paralysis of the seventh cranial nerve. Since the seventh nerve also sends secretory fibers to the lacrimal gland, the condition of dryness is exaggerated. The inability of the lids to close and moisten the surface of the eye, together with the increased dryness, leads to a desiccating or exposure keratitis. In cases where the condition is only temporary, even such a simple treatment as the application of adhesive strips over the lids will be a definite help. Surgery is indicated in the more severe forms.

Entropion and ectropion, and their consequences, are discussed adequately in textbooks of surgery and will not be considered here.

Conjunctivitis is an inflammation of the mucous membrane lining the lids (conjunctiva). This membrane is reflected on the bulbus at the fornices to the limbus. Its epithelial layer is continued as the corneal epithelium with the result that the cornea may become involved in conjunctivitis. Pain, hyperemia and photophobia are more or less constant symptoms. When it extends to the bulbar conjunctiva, the redness increases in intensity away from the limbus toward the fornices. Since the posterior conjunctival vessels are joined to the anterior ciliaries through the anas-

*The second in a series of three articles on the subject.

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tomotic branches from the major circle of the iris, severe conjunctival inflammation may result in engorgement of the anterior ciliary vessels. In the same manner, a severe hyperemia in the anterior segment may result in engorgement of the conjunctival vessels. If sufficient interstitial infiltration occurs during the course of the disease, the tissue will have a yellowish tinge. This is not icterus, as examination of other visible mucous membranes will show them to be perfectly normal. Conjunctivitis occurs in several forms, two of which are seen commonly. The various forms exhibit different grades.

Catarrhal Conjunctivitis.—The causes of this condition are many and diversified, such as cold, glare, wind, dust, seeds and irritant gases. The eye is more or less red with slightly swollen lids. The discharge accompanying the condition is watery or mucus-like in the early stages, but it may become mucopurulent if organisms enter the tissues as secondary invaders. Photophobia and blepharospasm are present to a greater or lesser extent, depending upon the severity of the condition. In the treatment of this type of conjunctivitis, it should be borne in mind that no bactericide can be used in sufficient strength to kill all the bacteria. Heat usually is contraindicated as it raises the temperature of the cul-de-sac, thus stimulating the growth of bacteria. The first and most important step is to remove the cause, if possible. A digital exploration of the cul-de-sac is of great help. This procedure is, of course, more applicable to large than small animals. The nictitans should be raised to see if any foreign material is held beneath it. The application of cold in the form of ice compresses is beneficial. Frequent irrigations with a nonirritating solution are definitely helpful. These should be as nearly isotonic as possible. Bichloride of mercury 1:10,000 and metaphen 1:8,000 or 1:10,000 are other effective irrigants. The value of these preparations is dependent upon the removal of irritant exudates and bacteria. Boric acid or boric acid and zinc sulfate, 1 gr. to the ounce, is helpful.

Acute Purulent Conjunctivitis.—This form of conjunctival inflammation is usually quite severe. The "eye" is extremely injected and the discharge is thick and profuse. Even the nictitans may become hyperemic and swell to a considerable extent. The cause of the condition is not known, though bacteria play an important rôle. In human medicine conjunctivitis has been attributed to numerous organisms, but relatively few have been accepted as positive causative agents. Purulent conjunctivitis often is observed in dogs with distemper and during the course of influenza-like infections. It also is seen in kittens, the mother cat usually showing signs of the disease, but to a much milder degree. The danger of this condition lies in the fact that the irritant exudate may bring about devitalization of the cornea, with the formation of a corneal ulcer and all of its unfavorable sequelae. The treatment of this type of conjunctivitis is a little more drastic than in the less severe, catarrhal type. Heat and bandaging are definitely contraindicated. Frequent flushing with bichloride 1:10,000 or metaphen 1:8,000 is of value. If zinc sulfate is to be used, it is well to increase the strength to 2 gr. to the ounce. Silver nitrate, 1 to 2 per cent, may be used, but the eye should be flushed with a copious amount of physiological saline immediately following this procedure. If carried out in this way, Ag NO₃ may be used every day. The application of some bland ointment to the lids at night will help to prevent them from sticking together. Yellow oxide of mercury is sometimes prescribed in this condition. If solutions are to be used in the treatment of conjunctivitis, the eye first should be flushed out with physiological saline so that the drug may come directly in contact with the tissues involved.

A chronic form of conjunctivitis is seen associated with such conditions as entropion, ectropion and trichiasis (inversion of the eyelashes). It also may be due to the presence of a small irritant foreign body that has not been observed in examination. This is especially true in the horse, where it is very easy for a small seed to

become lodged behind the nictitans and remain there unnoticed. The treatment of this condition depends upon the removal of the mechanical factor involved, followed if necessary by the same treatments outlined above.

Among the noninflammatory conditions of the conjunctiva, pterygium is rather commonly found. This condition (wing) is a triangular fold of conjunctiva, the apex of which extends out over, and is attached to, the cornea. In reality, it is neoplastic in that it represents a new growth of tissue. The structure grows without any evidence of an accompanying inflammation and is found almost invariably at the angles of the lid margins, usually at the inner canthus, and the base is continuous with the conjunctiva. The treatment is surgical.

DISEASES OF THE LACRIMAL APPARATUS

Diseases of the lacrimal apparatus are not common in domestic animals. The conditions encountered most frequently are congenital atresias of the openings of the various passages. When found in the foal, this affection is usually a result of closure of the nasal end of the lacrimo-nasal duct. A small knife will serve to open the duct, and irrigations of warm saline or boric acid will prevent the formation of a stricture. A closure of any part of the drainage system of the eye results in epiphora (tearing). When this occurs in the horse, attention always should be directed to the nasal opening of the lacrimo-nasal duct, as this is often the point at which the obstruction is present. This opening is readily accessible, and by using a cannula (the size of a 16-gauge needle) attached to a syringe, the duct can be flushed out with warm saline or boric acid solution. If the plunger meets resistance, pressure should not be exerted to force the fluid into the canal. Withdraw the cannula and allow the fluid that has entered to drain. After a few attempts, the duct will flush easily, and fluid will be seen to run out of the two puncta at the inner canthus. This procedure can not be carried out in other animals, as the nasal opening of the duct is

not accessible. In these cases it is necessary to insert a delicate cannula into the lower punctum at the inner canthus, and flush towards the nose. The procedure requires skill and precision and great care should be exercised in its execution. Occasionally cicatrices of the lids and conjunctiva, the result of wounds, as well as ectropion and entropion, are responsible for improper drainage of tears with a resultant epiphora. Surgical interference is necessary in these cases, but the results in most instances are not encouraging. The writer observed a case, in a horse, in which a rather severe wound in the region of the inner canthus resulted in the formation of a distorting cicatrix. While the nasolacrimal duct can be flushed by force, the deformity prevents the normal drainage of tears.

DISEASES OF THE CORNEA

Keratitis (Inflammation of the Cornea).—Every inflammation of the cornea begins with a clouding of the tissue due to the migration of leucocytes and an increased flow of lymph into the stroma. This may be followed by resorption which is complete in some instances and incomplete in others. In the latter case, cicatrization may lead to the formation of permanent scars. The ingrowth of vessels into the cornea accompanies some inflammatory changes. These vessels may be superficial or deep. In the former instance they are rather long, tortuous and red and can be seen to extend down over the limbus from the conjunctiva. Deep vascularization occurs as short, straight, regularly arranged vessels, usually gray, extending in from the limbal margin. In many cases of periodic ophthalmia, however, the writer has found them to be dark red. They can not be followed beyond the limbus since they are in the deeper structures. They are really bud-dings of the ciliary vessels. Vascularization of the cornea, regardless of type, is always an indication of a pathological condition. Keratitis presents several clinical manifestations, and may be divided into two classes, suppurative and nonsuppurative, these again being divided into super-

ficial and deep changes. The causes of the condition are many and varied; wounds, toxemias, extensions of pericorneal inflammations, burns from acids and alkalis, anterior uveitis and avitaminoses are a few which may be mentioned.

Wounds, as is the case with any tissue, vary according to the nature of the instrument by which they are inflicted. If severe enough, they may cause a loss of the intraocular structures, in which case an enucleation will have to be performed. If the causative agent carries in bacteria, it may result in panophthalmitis, in which case enucleation probably will be necessary. Scleritis is always an indication of panophthalmitis. When the instrument is sharp, such as glass or a knife, and leads only to a straight linear incision with the loss of fluid, a conjunctival flap, or suturing of the lids over the cornea, is beneficial. The application of this procedure to veterinary surgery is of questionable value, since complete non-interference on the part of the patient is necessary to bring about a recovery. A simple, superficial wound usually heals without any complications, but should be watched carefully for the presence of infection. To remove foreign bodies, proper anesthesia, illumination and magnification are necessary. Anesthetization may be carried out with 1 per cent holocaine.

Toxemias often result in the so-called interstitial or parenchymatous keratitis. It is doubtful that this condition can be considered an actual inflammation. It is really nothing more than a stasis of lymph and usually can be cleared up by the use of 5 per cent dionin, two or three drops in the affected eye twice a week. Urotropin, orally or intravenously, also may be used.

The cornea is exposed to lime or acid burns from time to time. The former are much more serious, since they leave a diffuse scar. In either type the eye should be washed first with any bland substance. In the event of an acid burn follow this treatment with 3 per cent sodium hydroxide, and when the burn is due to lime, use a very weak acetic acid solution.

Among the most dreaded complications of purulent conjunctivitis is ulceration of

the cornea. This process can not take place in the absence of organisms causing supuration. The condition also may be induced by contaminated agents traumatizing the cornea. Regardless of cause, the first symptom of ulceration is a localized, dense gray or grayish yellow area followed by exfoliation of the corneal tissue. The cornea gradually becomes hazy throughout. Pain, photophobia, lacrimation and blepharospasm are constant symptoms. The cornea often shows vascularization if the condition persists, and either type (superficial or deep) may be present. Secondary iritis often develops in association with this condition. This leads to a contraction of the pupil and the throwing off of exudates into the aqueous which causes it to become turbid. Fibrin in the exudate attaches itself to the posterior face of the cornea, directly back of the ulcer. Leucocytes are caught in its meshes, and the mass may fall to the bottom of the aqueous, constituting hypopion. The track of pus going from the ulcer to the hypopion seems to be in the layers of the cornea, but in reality it is back of this structure. Perforation of the cornea may follow, however, allowing the contents of the anterior chamber to escape. The sudden outflow of fluid may result in the passage of the iris through the opening, constituting prolapse of the iris and giving rise to leucoma. If a large part of the cornea sloughs away, allowing the iris and exudates to protrude, they may organize, giving rise to a staphyloma. A small central ulcer may permit only the fluid contents to escape, which allows the lens to be pushed forward and become adherent to the spot. When the anterior chamber refills, a small spot still remains on the anterior lens capsule. This is anterior capsular cataract.

The membrane of Descemet is resistant to the action of toxins and other irritants, as has been stated previously. If the ulcerative process can be stopped before rupture of this structure occurs, no untoward results may accrue. Touching the ulcer with pure phenol, tincture of iodine or trichloroacetic acid with a small applicator, such as a match stick, may prevent its spread. In human ophthalmology, actual thermocau-

tery sometimes is used. Curettement of the floor and margins is also useful. The use of a local anesthetic and extreme care are absolutely necessary in carrying out any of these procedures. One per cent atropine either in aqueous solution or incorporated in an ointment always should be used in ulcerative processes. This dilates the pupil, thus tending to prevent synechia and prolapse of the iris. It is the belief of the writer that the additional use of foreign protein is beneficial in this condition, as well as in any pathological alteration involving the anterior segment. Sterile milk is the cheapest and probably is as beneficial as any. Beginning with 0.5 to 1 cc. given intramuscularly, and increased by 0.5-cc. amounts up to 3 to 5 cc., the doses may be given safely every third day. When the maximum is reached, and no results have followed, this dose may be maintained until a definite arrest in the process is noted. Should "shock" occur, the intravenous administration of 1:10,000 adrenalin usually will alleviate this complication. In describing the procedure, the writer has in mind a case of severe bilateral corneal ulceration which was treated locally with almost all of the generally accepted measures without results. The cornea was about to rupture when a course of sterile milk was instituted and all other treatment stopped. In about two weeks active ulceration had ceased, the vessels in the cornea began to disappear and cicatrization began. The use of dionin following the sterile milk treatment reduced the opacities so that only two small scars remained. Potassium iodide, salicylates, cod liver oil or carotene in oil may be added as adjuvants to the local treatment.

There is one form of keratitis which is worthy of special mention: infectious keratitis or epizootic keratitis of cattle. This is a highly contagious disease of cattle and spreads rapidly through a herd once it has gained a start. The eye or eyes show(s) central corneal infiltration with beginning ulcer formation, and in many instances the whole cornea becomes opaque. Purulent conjunctivitis may or may not accompany the condition. The disease is

recognized by its rapid spread from animal to animal. Treatment is the same as for any ulcerative keratitis, and in addition there is a specific bacterin prepared by some commercial biological houses. The use of this product has resulted in marked arrest of the condition. In the writer's opinion, its value is not dependent upon its specificity, but rather upon the foreign protein effect, because of the rapidity with which results sometimes follow its administration.

Interstitial Keratitis.—This condition, as a rule, is not primary in animals. It usually is associated with iridocyclitis. The cornea rarely if ever ulcerates in this type of inflammation. It becomes hazy and lusterless and vascularization usually accompanies the condition. Pain, photophobia and lacrimation, the usual reactionary symptoms, are present. Being associated with iridocyclitis, it flares up and subsides as the former condition undergoes periods of exacerbation and quiescence. In animals other than the horse, in which it is most often seen associated with periodic ophthalmia, the condition is usually bilateral and is most frequently observed in debilitated animals. Because of its relation to iridocyclitis, the treatment of interstitial keratitis will be considered under the treatment of the former condition.

Desiccative Keratitis (Xerosis).—In this disease the cornea becomes dry, dull and lusterless. The conjunctiva often exhibits similar symptoms at the same time. It has been said to be due to a lack of vitamin A. It may be secondary to such conditions as lagophthalmus or exophthalmus, however. When due to avitaminosis, the addition of carotene oil or even cod liver oil is of benefit. When it occurs as a symptom associated with the other causes that were mentioned, surgery may be necessary.

One other condition of the cornea worthy of mention, but noninflammatory, is the corneal dermoid. This is usually a congenital defect and appears in either angle of the eye as a conjunctivo-corneal growth. It may extend over the entire cornea, but this is rare. The growth has the appear-

ance of skin and always is covered with hair.

DISEASES OF THE VASCULAR TRACT

Iritis, cyclitis and choroiditis are terms which refer to an inflammation of the individual parts of the vascular coat of the eye; uveitis refers to the inflammation of all three together. Because of the anatomical relationships referred to in part I* of this series of papers, there is usually a combination of iritis and cyclitis to give rise to iridocyclitis (anterior uveitis). This may exist independently of choroiditis. This is true at least in the early stages of recurring uveal inflammation. A peculiarity of the vascular tract is that once it has become involved in an inflammatory process, that process is prone to recur.

The classic example of uveal inflammation is seen in periodic ophthalmia of horses, but the disease also occurs in other animals and may be due to a variety of causes. Among these are trauma, symptomatic iridocyclitis that is associated with other infections, systemic disorders, focal infections, and a sympathetic type the basis of which is not understood. Whatever the cause, the symptoms are very similar. Lacrimation, photophobia and vascular engorgement (of the ciliary type) are constant pathological alterations. When the iris and ciliary body are involved, the pupil invariably contracts and is resistant to the action of mydriatics. The aqueous becomes turbid and even may exhibit the presence of a large fibrino-cellular mass (hyphopion), and occasionally hyphemia (blood in the anterior chamber). With the ophthalmoscope the vitreous is found to be hazy as a rule. Due to the alterations in the fluid contents of the globe, the nutrition to the lens may be disturbed, giving rise to an associated or complicated cataract. Exudates may form on the lens capsule, causing an adherence of the posterior face of the iris to the anterior lens capsule. This constitutes posterior synechia. A much more complete description of this

condition will be considered in the third and last paper of this series, dealing with periodic ophthalmia.

The treatment of iridocyclitis or uveitis consists first in removing the patient from strong light. Instillations of atropine (1 to 2 per cent), dionin (5 per cent) and hot fomentations are indicated. The parenteral use of foreign proteins and arsenicals, along with potassium iodide and salicylates internally, has produced good results in the hands of some veterinarians.

DISEASE OF THE LENS

Cataract is the term applied to any opacity of the lens or its capsules. The cause of cataract is the subject of much discussion, but still remains a mystery. There are certain experimental types, however, such as the electrical, traumatic and that induced by naphthalene. The basis for cataract is probably some disturbance in the nutrition of the lens due to disruption of the osmotic relationships. Certain other types are congenital. Still another is the complicated type associated with intraocular inflammation. Nephritis in dogs also may give rise to this condition. Cataract is no respecter of age, as the condition may occur in the young individual as well as in the old. The onset may be sudden or protracted.

The only satisfactory treatment for cataract is surgery and its value in veterinary practice is questionable, since absolute quiet on the part of the patient is imperative post-operatively. The surgical treatment of congenital or soft cataract is more successful, however, since the technic for this type is merely the discission operation. As far as the writer knows, no medication is successful in completely arresting the development of the condition. Because of the impractical application of most human technics to veterinary medicine, this subject will receive no further consideration here.

DISEASE OF THE RETINA AND OPTIC NERVE

Diseases of the retina of animals are not numerous; at least, veterinary literature contains but few descriptions of such cases. To be sure, retinitis is associated with uveitis in the horse, due to the dependence

*See July 1940 JOURNAL, pp. 34-37.

of this structure upon the choroid (see part I), but it is rare as a primary condition in animals. Detachment of the retina in animals is seen associated with exudative conditions of the choroid, but this most often is found associated with periodic ophthalmia in the horse. It may be observed, however, and not infrequently, as the result of severe blows or traumatism. The retinitis of hypertension and the retinal changes associated with vascular diseases and glomerulonephritis in man certainly can not be common in domestic animals, since these diseases rarely occur in lower animals.

Papilledema (Edema of the Disc, Choked Disc).—This is a condition in which the intraocular portion of the optic nerve becomes distended and swollen. It has been found in dairy cattle and has been induced experimentally in calves. In this group the mechanism seemed to be a narrowing of the optic foramen which resulted in interference of the circulation and consequent stasis of blood, giving rise to papilledema. Avitaminosis may or may not have been the cause of the condition. Edema of the disc also may be seen in any condition which raises the intracranial pressure. It may be associated with intracranial tumors.

Optic nerve atrophy, the direct antithesis of the previous condition, is not common in animals. It occurs as a primary or secondary condition. In simple or primary atrophy the edges of the disc are more sharply defined. The disc sometimes is diminished in size and the arteries almost always show a decrease in their caliber. In secondary atrophy the margins of the discs are hazy and somewhat irregular. The retinal arteries are narrow, the veins contracted and tortuous, and there is connective tissue proliferation upon the nerve head. It is associated with optic neuritis and the usual termination (in either type) is blindness.

The early recognition of many of the diseases of the retina and optic nerve depends upon the patient's complaint of failing vision and field defects. As a result, most of these conditions are not brought to the veterinarian's attention until the animal is

completely blind and the terminal ophthalmoscopic changes are seen.

CONDITIONS OF THE GLOBE AS A WHOLE

There are two conditions of the globe, both of which are characterized by an increase in intraocular tension but which are otherwise dissimilar. These are glaucoma and hydrophthalmus.

Glaucoma rarely is found in animals. Its symptoms are an increase in the intraocular tension without an increase in the size of the globe, marked episcleral injection, decrease in the depth of the anterior chamber and atrophy of the iris. The pupil often is dilated and has a peculiar greenish cast. Failing vision terminating in blindness is the rule. The resistance of the globe to increased tension gives rise to a cupping of the optic disc, which is characteristic. The condition may be primary or secondary. Medical treatment consists of the use of myotics, such as eserine, 0.5 to 1 per cent, alternated with pilocarpine hydrochloride, 1 or 2 per cent. Hot compresses applied locally, together with cathartics, may be beneficial. Description of surgical treatment of this condition can be found in any textbook on ophthalmic surgery.

Hydrophthalmus, buphthalmus, or dropsy of the eyeball is a condition in which there is an interference with the outflow of the aqueous humor and intraocular fluids, with a resultant increase in the size of the globe. The external structures, due to the increased tension, become stretched and enlarged. The increase in the size and the bulging produced in the cornea is sometimes spoken of as keratoglobus. This condition is not infrequently encountered in dogs. Sometimes it is referable to a previous injury, but more often its cause is undetermined. The treatment outlined under glaucoma may be tried, but it is usually necessary to resort to enucleation. When the condition gives rise to much pain and discomfort, the following may be used:

Holocaine hydrochloride....	2 gr.
Boric acid	20 gr.
Aq. dist.	2 oz.

A few drops instilled into the eye twice a day usually is comforting.

CLINICAL DATA

Glucose Tolerance in Horses*

R. P. LINK, D.V.M., M.Sc.

Manhattan, Kan.

GLUCOSE is a valuable medicinal food, as is evidenced by its widespread use in clinical work. However, the literature reveals little information regarding the amount of this simple sugar which can be administered to horses without exceeding the "renal threshold." Therefore, this work was done in an effort to determine the "renal threshold" and obtain information concerning the amount of glucose which can be given intravenously without exceeding the threshold level.

The physical condition of the animals used in these experiments was found to be an important factor in that those which were in poor condition had a lower initial blood-sugar level than those in good condition and consequently took more glucose to elevate the blood-sugar concentration to the threshold. Also, the functional capacities of the liver and pancreas are not to be disregarded when considering glucose utilization in the body.

Whitnah, Riddell and Hodgson¹ gave cows glucose *via* the stomach tube and found the greatest increase in the blood sugar about the fourth hour after giving the glucose. This increase in blood sugar lasted more than 24 hours. No attempt was made to determine the "renal threshold" for the cow by these workers. Using dogs, Wierzuchowski² found the "renal threshold" for blood sugar to be about 200 mg. per 100 cc. of blood. At this level there was an excessive amount of sugar in the urine.

*From the Division of Veterinary Medicine, Kansas State College.

¹Whitnah, C. H., Riddell, W. H., and Hodgson, R. E.: Effect of increased blood glucose on milk sugar. *J. Dairy Sci.* xvi (July 1933), pp. 347-353.

²Wierzuchowski, M.: Limiting rate of assimilation of glucose introduced intravenously at constant speed in resting dog. *J. Physiol.* lxxxvii (Sept. 1936), pp. 311-335.

EXPERIMENTAL PROCEDURE

The animals used in these experiments varied in age from 2 years to 17 years, and there was a wide variation in body weights. These factors have a tendency to vary the uniformity of the results but are of value because the clinician finds similar variations among his patients. All of the animals were fed hay and grain twice daily. Some were used on successive days, thus giving an opportunity to observe the effect of repeated injections of glucose.

The glucose solutions were prepared from anhydrous glucose and distilled water, and sterilized in an autoclave. The injections were made into the jugular vein by gravitation, the force being regulated according to the desired rate of injection.

The blood samples used for analysis were collected in sterile tubes containing sufficient sodium citrate to prevent coagulation. One sample was collected before any glucose was administered, and others were collected at 5, 15, 30 and 60 minute intervals after the completion of the injection. The urinary bladder was emptied by the use of a catheter before the glucose injection, and the catheter was left in the urethra to keep the bladder drained at all times. The amount of urine secreted during 10-minute intervals was measured to determine whether the glucose produced any marked diuretic effect.

Blood-sugar determinations were made by using the Shaffer-Hartmann-Somogyi method. Fehling's copper reduction test was used as a qualitative test for sugar in the urine. Those samples containing reducing sugars were analyzed by a quantitative test in which a standardized Fehling's solution was used.

RESULTS

The results from these experiments, involving nine horses of various ages and weights, indicate a mean variation of 36.13 mg. per 100 cc. of blood in the blood-sugar levels before glucose was injected. This appears to be a wide variation, but the low reading, 66.58 mg., was in a 17-year-old horse in very poor condition. The high reading, 102.71 mg., was in a 2-year-old colt in good condition. The average of the normal blood-sugar levels for the group was 82.67 mg. per 100 cc. of blood.

Following the injection of 50 Gm. of glucose the average rise in the blood-sugar level five minutes after the injections were completed was 21.12 mg. When the amount of glucose was increased to 75 Gm., the average increase was 55.02 mg. Some of the animals were given 100 Gm. of glucose, resulting in an average increase of 101.28 mg. in the blood-sugar level five minutes after completion of the injections. The average amount of time required to make these injections was 15 minutes.

The greatest increase in blood sugar was noted five minutes after completion of the injection, and following that there was a gradual decline, although at the end of 24 hours the sugar level was above the original reading. Our results indicate that it takes a larger amount of glucose to elevate the blood sugar to the threshold level in an emaciated animal than in one in good condition. But the "renal threshold" seems to be at about the same level in all of the animals used in these experiments. From our observations on the animals used in this work, it appears that the "renal threshold" for blood sugar in the horse is about 150 mg. per 100 cc. of blood. This conclusion is arrived at after considering the data, which show that when the sugar level is raised just above this figure, a trace of sugar appears in the urine. In one horse the blood-sugar level was 151.15 mg. after the injection of 75 Gm. of glucose, and a slight trace of sugar appeared in the urine.

Table I represents approximately the average of all our results. However, it is not an average but is compiled from our

results on one animal. As will be noticed there is not any marked diuretic effect produced when only 75 Gm. of glucose is injected. Larger amounts of glucose were found to have more effect as a diuretic.

TABLE I—Results with 4-year-old mare, weight about 1,400 lb., given 75 Gm. of glucose in 50 per cent solution; injection time, 17 minutes.

MINUTES AFTER INJECTION OF GLUCOSE	MG. GLUCOSE PER 100 CC. BLOOD	GM. GLUCOSE PER 100 CC. URINE	AMOUNT OF URINE IN 10-MINUTE PERIOD
Before	90.91	0	31 cc.
5	153.46	0.93	39 cc.
15	125.60	0	34 cc.
30	111.10	0	32 cc.
60	101.96	0	28 cc.
24 hours	93.50	0	—

SUMMARY AND CONCLUSIONS

The administration of glucose to animals on successive days seems to cause a gradual increase in the blood-sugar level. To what extent this would apply to animals in a diseased condition was not determined in these experiments.

Our results indicate that 50 Gm. of glucose can be injected into an average-size horse in ten minutes without elevating the blood sugar to the "renal threshold," but that 75 Gm. injected in 15 minutes resulted in a trace of sugar in the urine.

The age and condition of the animal is a factor governing the amount of glucose it can tolerate.

Rapid administration of comparatively small amounts of glucose will produce a temporary hyperglycemia and glycosuria. Since the excess glucose is normally converted into glycogen and stored in the liver and muscles, the rate of conversion is limited, and rapid administration of even small amounts may temporarily exceed the conversion powers of the body. Only a small amount of the blood conveyed to the heart by the anterior vena cava passes through the liver before it goes through other parts of the systemic circulation. Therefore, this may explain why the "renal threshold" is exceeded by comparatively small amounts of glucose when given intravenously, with resultant glycosuria.

Coccidioidal Infection in a Dog

O. J. FARNESS,* M.D.

Tucson, Ariz.

Coccidioides immitis infection is known to occur spontaneously in humans, cattle and sheep. It is now my privilege to add to this list, the dog.

The organism responsible for this disease occurs in two forms or cycles: the parasitic form, which is found in infected tissue, and

when the organism enters the body through the broken skin, is the respiratory passages.

In humans the onset of the infection is often acute with fever, cough and sputum. X-ray films of the chest show scattered densities through the lungs which are easily mistaken for pneumonia or tuberculosis. The lymph nodes at the root of the lung are practically always enlarged. Recovery from the primary infection is common, but in an undetermined percentage of cases the disease progresses to the secondary chronic stage, which has a case fatality rate of over 50 per cent. No age is immune.

Diagnosis of the disease is certain only by laboratory means, i.e., by finding the

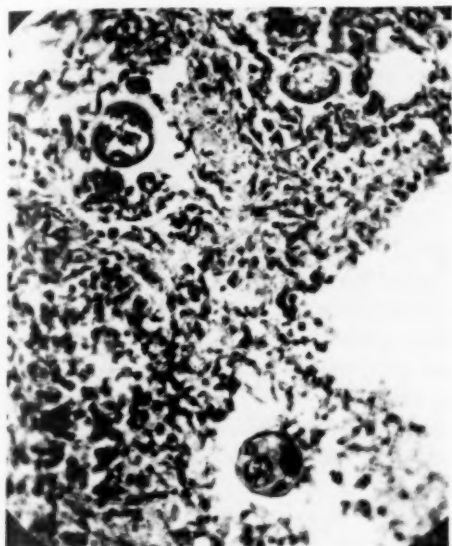


Fig. 1. *Coccidioides* spherules in dog's lung. Note ascospores within large spherule.

the vegetative form, which is found in culture and presumably in nature. In infected tissue and sputum the organism appears as a spherule varying from 5 to 60 μ in diameter, and having a highly refractile double-contoured capsule. The spherule form is presumably not transmissible, as man-to-man or animal-to-man infection is unknown. On suitable media long mycelia are formed which bear chlamydoconidia that are easily transported through the air. It is generally believed that the chlamydoconidia inhabit the soil and thereby are responsible for transmitting the infection. The portal of entry, except in the occasional instance

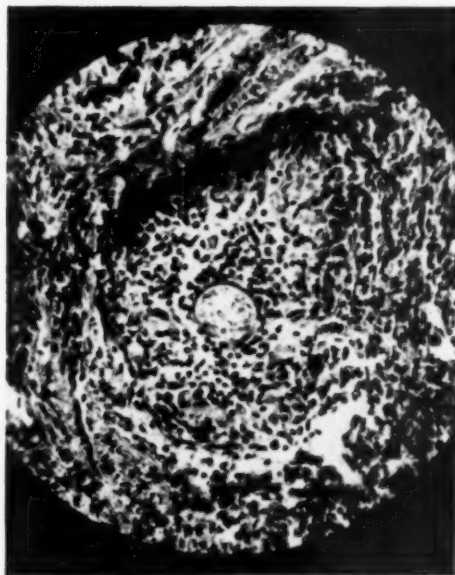


Fig. 2. *Coccidioides* spherule in the center of a tubercle-like nodule.

characteristic spherules with their double-contoured capsules in infected material and confirming this finding by culture and guinea pig inoculation.

In humans a characteristic skin reaction is obtained by the intracutaneous injection

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of coccidioidin, a broth filtrate of a *Coccidioides* culture. The reaction reaches its height within 48 hours and very closely resembles the tuberculin reaction, with both erythema and induration and, in some instances, vesiculation of the central zone of edema. Coccidioidin as prepared by Charles E. Smith of the Stanford University School of Medicine is a potent product and available on request.

REPORT OF CASE

Sarah, a Great Dane, was whelped in July 1937. She, with her litter mates, suffered from severe rickets. She had always had difficulty using her hind legs and this disability became so total that the dog had to be destroyed. The owner does not remember that the dog was otherwise sick.

On April 10, 1939, the dog was chloroformed by G. G. Crosbie of Tucson. He performed a postmortem examination and found multiple small nodules, some necrotic, scattered through both lungs. The liver, spleen and kidneys also contained nodules. Grossly the lesions resembled tuberculosis, but on microscopic examination of stained sections from the lung tissue, instead of finding tubercle bacilli, Ludwig Lindberg, Tucson pathologist, found numerous *Coccidioides* spherules (figs. 1 and 2).

COMMENT

In checking back over this interesting case, one can not help but speculate as to the real cause of the weakness of the rear extremities. We know that in humans coccidioidal meningitis is not uncommon and coccidioidal abscess of the brain has been observed. Unfortunately, examination of the brain and spinal cord was not included in the autopsy; therefore, we do not know that the central nervous system structures were involved in this case.

I hope that this report will serve to stimulate interest in this fungus disease, which apparently is not uncommon and which has a mortality that is not insignificant.

Ketosis in a Mare

J. E. WEINMAN, D.V.S.

Lincoln, Neb.

THE SUBJECT was a pony mare, 4 years old, running in an exuberant pasture with other ponies and horses. All were in good physical condition until one morning, May 21, when this pony did not come in to drink with the others. The owner suspected colic or sleeping sickness.

The main symptoms were gauntness, depression and incoordination. Although in the tenth month of gestation, the abdomen was tucked up. When brought in the animal refused to eat and at times would stagger, fall down, and rise again as if suffering from colicky pains. There were no bowel movements, although after washing 2½ gallons of normal salt solution into the stomach, borborygmus was pronounced. The temperature was 101.2° F., the pulse 80 and thready, and the conjunctiva slightly icteric. The rectum contained a small amount of feces and the bladder the usual quantity of urine. On the presumption that the case was one of intestinal toxemia, 1 lb. of Epsom salt and a mixture of glucose, methylene blue and sodium thiosulfate was given. The medication included also a quart of mineral oil, digitalis and aromatic spirits of ammonia. No benefit was derived from the medication.

The postmortem examination revealed the presence of a few strongyles (larvae and adult worms); an abscess the size of a hazelnut at the base of the cecum; a light-colored liver of fatty consistency, parts of which would float in water like the liver in bovine ketosis. At the Department of Pathology, University of Nebraska, where a specimen of the liver was taken for examination, Dr. Van Es remarked about this similarity and, upon further examination microscopically, approved my suspicion that this was a case of ketosis.

The Texas Longhorns, now practically extinct, are descendants of calves brought to America by the Spaniards in 1521.

Apoplexy in a Canary*

A. J. DURANT, B.S.A., A.M., D.V.M., and

H. C. McDOUGLE

Columbia, Mo.

APOPLEXY in birds and animals probably occurs more frequently than is generally recognized, although there are many more such cases reported in man than in birds and animals.

This disease may be defined as "a sudden paralysis and coma from effusion and extravasation of blood or serum into the brain or spinal cord," or "a copious extravasation of blood within an organ."

Bullard¹ reported a case of apoplexy in a 2-year-old Berkshire boar. He stated that the animal fell to the ground when affected, but arose immediately and started to walk in an aimless manner in various directions in the pen, and up and down the fence, bracing or pushing himself against it. At other times he would lie or stand with his head forced into a corner. Death occurred ten days from the time of the first symptom. During this interim the boar did not eat or drink, although he appeared thirsty.

Mention is made of the clinical symptoms exhibited by the boar because there appears to be some similarity in the symptoms he exhibited and the symptoms observed in the canary we studied.

In regard to handling birds in the hospital, Rattigan² stated, "When the birds, especially canaries, are brought to the hospital, one should have the cage or box placed upon the examination table before uncovering it, and let the owner remove the bird. . . I remember a canary not very sick, dying from fright when taken from the box by the veterinarian's assistant." It is likely that this was a case of apoplexy, although no mention is made of the results of the autopsy.

The specific case reported is of a canary owned by a nationally recognized authority

on canary breeding. Previous to the onset of the attack the owner reported that the canary was very tame, always perching on her head and shoulders when she was working in the flight cage. At the time of the attack the bird was found on the floor of the cage, partially paralyzed, with the legs spread apart. It seemed greatly frightened and excited, afraid of everything and everyone. These symptoms continued for two days, at the end of which the legs had become practically inactive. The bird died apparently while attempting to drink water. According to the owner, when the bird was found dead, the neck seemed to be broken or limp and a blood clot was noticed along

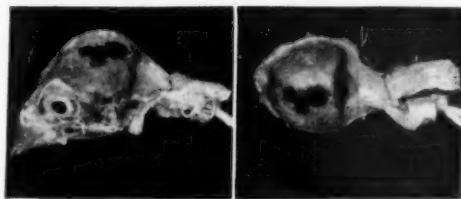


Fig. 1. Left: View of the affected canary's head with the skin removed, showing the hemorrhage on the under side of the skull cap. Right: Posterior view of the head, showing more clearly the hemorrhage at the base of the brain that caused pressure and death.

the neck closely adjacent to the base of the skull. Previous to the attack there was no history that the bird had been injured or frightened in any way which might have caused it to strike its head and produce the hemorrhage. Autopsy did not reveal any bruises or skin lesions indicating such an accident.

Figure 1 shows two views of the head with the skin removed. The hemorrhage in the skull cap (upper view) is indicated by the dark-colored area. However, this had nothing to do with the bird's death. The lower view of the skull shows an extensive dark hemorrhagic area at the base and extending toward the right. After this

*From the Department of Veterinary Science, Missouri Agricultural Experiment Station, journal series No. 619.

¹Bullard, J. F.: Apoplexy in a Berkshire boar. J.A.V.M.A., lxxvii (1930), n.s. 30 (2), pp. 236-237.

²Rattigan, W. J.: Treatment of caged birds. Vet. Med., xxiv (May 1929), p. 221.

photograph was made the skull cap was carefully removed, revealing an extensive hemorrhagic area at the posterior base of the right hemisphere extending from the cerebellum anterior to the internal acoustic meatus.

Veterinarians should caution canary owners to avoid sudden fright of their birds. It is advisable when called to treat a canary to allow the owner to remove the bird from the cage, as suggested previously.

Unique Pathological Condition

An unusual pathological condition in the heart of an aged cow is illustrated below. The growth was the size of a hen's egg. The cow appeared normal at the time of slaughter. This specimen has been pre-



served and is a part of the pathological exhibit at the Washington meeting. [*Submitted by G. E. Mitchell, D.V.M., inspector in charge, U. S. bureau of animal industry, Memphis, Tenn.*]

An Unusual Case of Sexual Excitement in a Kitten

J. B. McQUOWN, D.V.M.

Tucson, Ariz.

A CLIENT brought in a 3½-month-old kitten for castration on March 15, 1940. An examination revealed but one testis in the scrotum. This was removed in the hope that the other would develop more rapidly and possibly make its descent. No change took place during the next few weeks.

A little later we were informed that this

patient had been jumping on the shoulders of the owners, licking them as well as lunging at their ankles, often chewing them severely. At other times the kitten would meow and constantly be in motion, in general manifesting all the symptoms of sexual excitement. During this time he would urinate on the rugs, upholstery, on top of the dressing table, etc. A pantomime courtship would be carried on with himself in front of the mirror.

On June 16, the patient was given an anesthetic dose of nembutal and a laparotomy was performed. A rudimentary uterus, two normal horns and ovaries were observed. Externally, the genitalia were identical with a unilateral cryptorchid.

Local Meat Inspection

Though ours is not the only country in which there are cities, towns and villages where meat is prepared and sold without being inspected by anyone, this part of our veterinary service has not kept pace with developments in other directions, such as the stamping out of sweeping infections. In other words, the conservation of property has been placed ahead of the preservation of public health. In fact, but for the extensive ramifications of the federal meat-inspection service, the American people would be badly exposed to the consumption of unwholesome meat and dangerous meat products, which take their toll in specific transmissible infections, malnutrition and digestive troubles galore. The extension of meat inspection to every animal slaughtered, even on the farm where animals are butchered for home use, is an end toward which the veterinary profession should work. The step is feasible, inexpensive and worth while.

The relation of feeding to breeding brought about by the new knowledge of nutrition extends the scope of veterinary science far beyond the former conception of pathology.

If half of what is said about the anthelmintic property of phenothiazine is true, a group of toxic worm remedies will soon pass out of everyday use.

Brucellosis in Horses

ALTHOUGH BRUCELLOSIS, duly confirmed by the agglutination test, is quite common in solipeds, the disease is not frequently recognized in routine clinical work until such discrete symptoms as fistula of the withers, poll evil *et al* make their appearance. Because the general symptoms are vague, they seem to be either overlooked or else passed off as a transient asthenia of no particular consequence. That is to say, brucellosis in the horse that has not localized is seldom diagnosed as such.

ABORTIONS RARE

In mares abortion from brucellosis is rare. Death and expulsion of the fetus is not a common expression of *Brucella* infection in the soliped. When mares abort, one looks for other causes. Moreover, the suppurative complications (purulent fistulas) now known to be associated with generalized brucellosis in the equine species are neither constant nor pathognomonic. Much the same as the mammary gland and placenta are places of predilection for Bang's bacillus in cattle, the injured withers, poll, breast, carpal bursa (in cattle) are but nesting places for the specific organism already present in the patient's body. For reasons unknown the mammary gland and uterus of mares are not the common harbors for *Brucella* infections.

SYMPTOMS

According to Rubay, Rinjard, Rossi and van der Hoeden, who have studied equine brucellosis extensively in Belgium,* the disease in solipeds is an entity to be considered. It is an asthenic, febrile ailment the frequency of which in clinical work remains to be determined. Although the somewhat

high incidence of the disease in horses as determined by serum agglutination is no longer debatable, there is considerable question as to its frequency as a visible or in apparent generalized infection. In other words, to what extent brucellosis flares up as a disabling, febrile disease is not common knowledge.

Belgian authorities (*loc. cit.*) describe the disease as a veritable septicemia manifested by fever, weakness, loss of flesh and rheumatism. The patient tires at work or may be incapable of working. The fever is undulant and sometimes runs high. The pulse is weak and slow. The pulse rate does not correspond to the rise in temperature. As the latter goes up the former goes down. The discordance between pulse rate and body temperature is pointed out as typical evidence of brucellosis in horses. The fever lasts about three weeks, declines for a few days, and then recurs. This series of events continues for weeks and months as the sole evidence of the septicemic illness.

Though some cases develop local complications (purulent fistula), these outbursts occur also from common pyogenic infections in which Bang's bacillus plays no part. In fine, it seems evident that brucellosis in horses exists in varied degrees of severity and, being frequently unrecognized, it is obvious that testing the blood of horses that are mysteriously febrile or temporarily asthenic would be a practice worth while.

TREATMENT

Based upon the remarkable developments in bactericidal action of sulfanilamide and related compounds, it is logical to look toward chemotherapy for the remedy. The main preventive measure is avoiding contact with cows affected with Bang's disease.

*Annales de Médecine Vétérinaire, Feb. 1937.

AVMA CONVENTION AIRED OVER NBC

Highlights of the 77th annual convention will be reported during a special broadcast on the National Farm and Home Hour, Saturday, August 31, at 10:30 a. m. CST (11:30 a. m. CDST; 12:30 p. m. EDST) over the NBC-Blue network.

New methods of safeguarding the health of America's food, work and Army animals are among the reports to be heard. The recipient of the 12th International Veterinary Congress prize will speak on the broadcast.

SURGERY & OBSTETRICS

Enucleation of the Eyeball

B. S. KILLIAN. D.V.M.

Somerville, Mass.

ENUCLEATION of the eyeball in small animals is indicated when foreign bodies have penetrated the cornea and involve the anterior and posterior chambers, particularly when some of the content of the eyeball has been lost or severe expulsive hemor-



Expulsive hemorrhage. Patient attacked by larger dog.

rhage has taken place; when the animal has been injured by an automobile; when a small dog, such as the Pekingese, has been attacked by a large dog; and when staphylococcal infection of the cornea and sclera or hemorrhagic glaucoma exists.

MATERIALS AND PROCEDURE

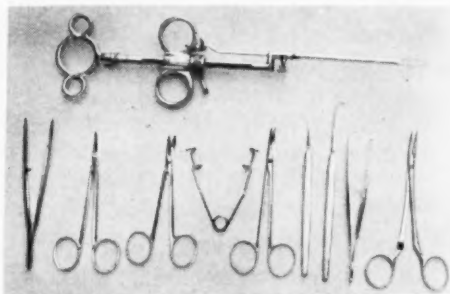
Nembutal anesthesia is preferred by the writer. The instruments required are a tonsil snare, tissue forceps, three pairs of scissors, eye speculum, cataract knife, strabismus hook, fixation forceps and hemostat.

Clean the eye and lids with boric acid

solution. Shave the upper and lower lids, holding them apart with the eye speculum. The fixation forceps are applied at the junction of the cornea and sclera, at the lower surface. The conjunctiva should be divided as close as possible to the cornea, circumcising the cornea. Next, Tenon's capsule is divided. The strabismus hook is inserted under the tendons of the oculi muscles, each of these being divided separately from left to right and the eyeball brought forward.

The optic nerve and vessels may be divided by either of the following methods:

1) Insert a pair of curved enucleation scissors between the freed eyeball and conjunctiva, locate the nerve with the blades closed, then open the jaws of the scissors



Instruments required in operation. Top: tonsil snare. Below (left to right): tissue forceps, scissors, scissors, eye speculum, scissors, cataract knife, strabismus hook, fixation forceps, hemostat.

and cut the nerve squarely across. After this has been done, incise the remaining tissue attached to the eyeball.

2) Pass the tonsil snare over the freed eye, from which all conjunctiva and adjacent tissue have been divided. Draw the eyeball forward as far as possible without tearing the nerve and vessels, insert the snare deep into the socket and gradually

close the snare until there is a little pressure. Then turn the handle and crush the nerve and vessels. Be careful not to jerk or pull the snare. The snare serves to prevent extensive hemorrhage. If hemorrhage occurs, it can be controlled by inserting sterile gauze with pressure. If the eye is



Mask with openings for ears and cups which prevent mask from touching eyes, also preventing dog from scratching eyes.

badly lacerated, use sutures for traction. When the eyeball is soft, saline solution



Mask allows dog to move about without rubbing or striking wound.

one fourth of an inch from the edges, including the Meibomian glands.

A mattress suture is used to close the lids, leaving a small opening at the inner canthus for removal of packing, if used. When packing is used, withdraw a small piece, and cut off on the second day. The third day, remove the packing carefully to avoid causing a secondary hemorrhage; this is imperative where the edges of the conjunctiva are not sutured and the packing is deep in the socket of the eye. After treatment, use a mask, as illustrated, which is made by H. Hauptner of Berlin.

POST-OPERATIVE CARE

Send the patient home with instructions to the owner to leave the mask on at all times, except when feeding, and to return



Eyelids healed; dog normal.

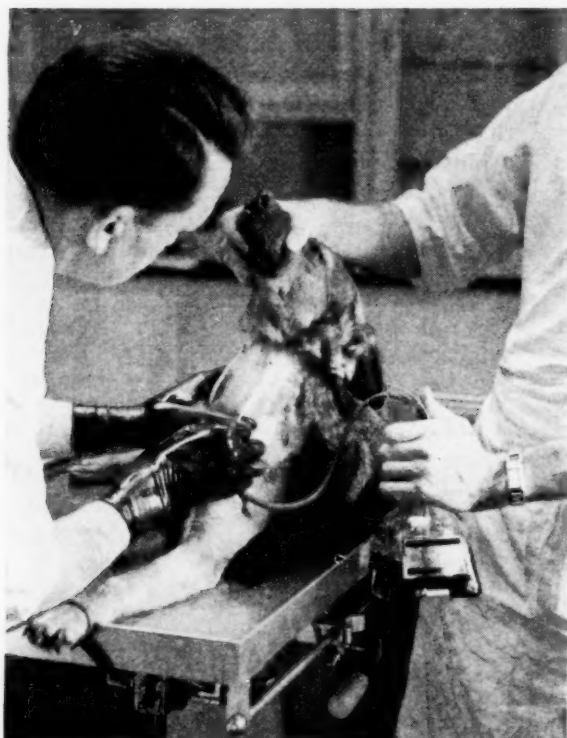
the animal on the second or third day for dressing, then every other day until the stitches are removed, which is usually the eighth day. As a safeguard after the stitches are removed, put on a Lacroix collar.

The photographs of the Pekingese depict one of the many cases of this type that have been brought to the writer. This patient was attacked by a large dog, with resultant severe expulsive hemorrhage which necessitated enucleation of the eyeball.

A case of surra (= *Trypanosoma evansi* infection) in a dog is described in the March 1940 issue of *The Indian Veterinary Journal*.

may be injected into the posterior chamber to fill the collapsed eyeball. Suture the free edges of the conjunctiva with 00 catgut. The lids are incised in a circular manner

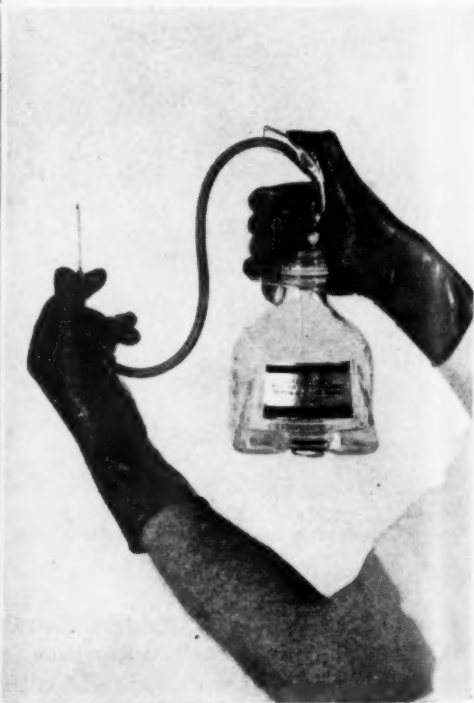
A New Technic of Collecting and Transfusing Blood



Upper left: A 2.5 in., 16 gauge stainless steel needle is used for puncturing the jugular vein. The donor flask contains a sufficient amount of 2.5 per cent sodium citrate to prevent the coagulation of 500 cc. of blood. This solution is under a vacuum sufficient to enhance the withdrawal of blood from the vein. Usually 10 cc. of blood per pound of body weight can be removed with safety at three-week intervals. The bleeding operation must be carried out under strict asepsis. The spring-roller clamp on that part of the rubber tube adjacent to the donor flask regulates the blood flow from the donor into the flask. It is important to agitate the donor flask in order to insure the proper mixing of the blood and sodium citrate solution.

Lower left: Technic of making the transfusion. The smaller flask contains physiological salt solution for flushing the tubes and Murphy drip before and after releasing the blood from the bank. This procedure facilitates the flow of the blood through the apparatus. The special Murphy drip contains a stainless steel filter which traps small particles of clotted blood. The rate of blood flow can be regulated by either of the two metal clamps located above and below the drip apparatus. A rate of 8 to 9 cc. per minute is satisfactory for most cases.

Lower right: Close-up of the donor flask, showing the vacuum release-control mechanism.



EDITORIAL

Comparative and Relative Advantages of Incorporating Not for Profit Under Charter

Frequent inquiries as to the advantage of incorporating state and local associations in lieu of operating as loosely organized societies have led the executive office to obtain a definite legal opinion on the subject for the guidance of officers and members of such organizations. The document presented by the Association's legal adviser is as follows:

WHEN A GROUP of individuals associate for a specific purpose, the question often arises regarding the advisability of operating under a corporate form and under a corporate name without the formality of obtaining a charter from the state wherein the association is located.

It is important, therefore, to determine when a question such as the above is under consideration whether or not there are substantial advantages in doing business as a not-for-profit corporation under a charter. It appears that there are some advantages that deserve careful consideration.

In the first instance the group not incorporated possibly could not sue in some jurisdictions unless all members were made party plaintiffs. If incorporated, suit is brought in the name of the corporation.

In the second instance a group operating without a charter could not own real estate, for if it wanted to subsequently convey the property, who could properly issue a deed that would satisfy a purchaser? It is not to be inferred that real property under certain circumstances could not be purchased by the unincorporated group; however, many legal questions would arise that would make such a purchase or sale impractical, cumbersome and in some instances impossible. A group incorporated under a charter would take title to property in its corporate name or issue a deed to property as a corporation, making the transaction simple and legal.

One of the most important questions is that of personal liability. A group functioning with properly designated officers under by-laws without a charter will find

themselves personally and individually liable, and it was held that when individuals act under a corporate form and in a corporate name, when there is in fact no corporation, they have not thereby absolved themselves from personal liability and are liable as partners. (P.B. Co. vs. W., 291 Ill. A.L.R. 579.) It is apparent, therefore, that operating under charter as a non-profit corporation avoids personal liability, and this is one of the most important advantages of incorporation.

It also must be borne in mind that the validity of the contracts of a chartered corporation organized and existing under the laws of the state wherein its main office is located is not as readily open to question as that of those contracts made by a loosely organized group operating without a charter.

The preservation of the name of the association is important, and a corporation has the advantage of the protection of its name for the life of the charter. An unincorporated group has no name protection and in the event a disgruntled faction decides to open and operate a competing association, they could adopt the name of the original group.

Further, in some jurisdictions one must consider the incapacity of a voluntary unincorporated association to receive and administer charitable gifts, and in Illinois it has been held that a chartered not-for-profit corporation is not liable for its torts.

In most jurisdictions the cost of incorporating a non-profit group is nominal. It appears, and the record shows, that it is decidedly advisable to incorporate.

The Invisible Enemies of Life: Viruses

ARISTOTLE (384-322 B. C.), son of the King's physician* and the most sophisticated of the Greek philosophers, drew a narrow line between living and nonliving matter, even as the scientists of 1940 engaged in the study of certain diseases debate over the chemical or biological nature of viruses.

The theory of living contagion, therefore, did not begin with Jenner, Pasteur, Villiman, Koch, Lister and their contemporaries in the field of medical research. Granting that the reasoning of the brilliant Greek philosopher was not related to medical knowledge, other predecessors of these pioneers can be named. It was the microscopists of the 17th century who kindled the fire of scientific medical investigation which led to the present conception of the invisible etiological agents called viruses.

Athanasius Kircher, Italian Jesuit, fathered the germ theory of disease in the early 1600's. He discovered "worms" in the blood of patients stricken with bubonic plague (black death), and about this time Robert Boyle of Ireland wrote an essay pointing out the relationship between the phenomena of fermentation and fevers, obviously impressed with the microscopy of Anton van Leeuwenhoek (1632-1723), whose fame is inseparably dovetailed into the annals of invisible life through having developed magnification up to 300 diameters by the grinding of lenses. In short, what was later discovered on the microbic cause of disease was built upon the groundwork laid by these early microscopists.

Jenner's discovery (1798) of smallpox vaccination was not an accident of empirical medicine, for when Jenner wrote that viruses are generated in the body of the sick and when generated perpetuate by contact, he certainly showed insight to the nature of the disease he was investigating. It is said that when Jenner remarked that "the pustules [of smallpox] are filled

with virus" he made use of the word "virus" as a strictly medical term for the first time. The experimental work of Jenner is the first rung of the ladder that now leads to our conception of virus diseases and, certainly, it was the first use of a modified virus in preventive medicine.

Microscopic life and ultramicroscopic life were first distinguished one from the other through the work of Chamberlain of the Pasteur laboratory (1877), who devised the porcelain filter which still bears his name. Straining out the figured organisms from infectious material without reducing the virulence of it marks the beginning of scientific investigation of virus diseases. The Berkefeld filter of the research laboratory was devised by Nordmeyer (1891) but was named for the owner of the mine where the remarkable filtering capabilities of infusorial earth were discovered.

By means of these filters Ivanovski, Russian botanist (1892), demonstrated that a filtrate of tobacco leaves affected with mosaic disease, although deprived of all bacteria by the filtration, would still cause the disease when rubbed into normal tobacco leaves. Ivanovski, therefore, furnished the first proof of the existence of a virus disease. Here was the real starting point of our present knowledge of the group of virus infections of plant and animal life.

Measuring the dimensions of virus particles by means of improved filtering methods, photography, roentgenography, magnetism, centrifugation, etc., is startling to the microscopist unaccustomed to magnification of 20,000 diameters. The tiny egg-albumen molecule compared with an erythrocyte, for example, impresses the mind on the chain of events lying along the road connecting the work of the pioneers with that of the moment.

More than 100 important virus diseases of plants, the group of deadly virus infections of man, not to mention a longer list threatening the food-producing animals, exemplify the incalculable potentiality of these invisible enemies of this civilization.

*Nicomachus, physician of King Amyntas of Macedonia.

In our sphere alone the very names of the known virus diseases point to the need of eternal vigilance in virus-disease research and prophylaxis.

Rabies Control

WE HAVE HAD to refuse publication of several letters from members insisting that the control of rabies should be placed in the hands of local boards of health who in turn will employ veterinarians to help out. The reason for this refusal is that the national association believes that controlling diseases of animals is a duty of the veterinary service, and that the veterinary profession can never approve the turning of any part of animal-disease management to other agencies. The Association is for the D.V.M.'s exclusively and is bent upon protecting that title as vigorously as the A.M.A. protects its M.D.'s. The fact that groups of veterinarians for the moment can vaccinate more dogs by working with health officers does not alter the principle involved, for in the end the eradication of rabies from the country, not solely from communities scared for a short spell on account of a mad dog scare, is the result to be achieved.

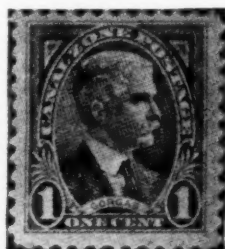
With health officers in charge of rabies, sanitary engineers supervising milk inspection and Ph.D.'s charged with passing upon the merits of dog feeds, what argument is left to keep federal meat inspection in the veterinary service? Breaking the rungs of the ladder makes climbing harder.

Story of the Insect Vector

TO KEEP history straight, it should be remembered that the mosquito as the carrier of yellow fever virus was suspected and announced in 1881 by Carlos Juan Finlay of Cuba. Finlay even pointed out the *Stegomyia fasciata* as the suspected vector and announced the fact to the Havana Royal Academy of Science. Twenty years later, Walter Reed, heading a board of medical officers appointed by Surgeon General Sternberg in 1900, went to Havana and carried out the experimental work that proved Finlay's contention. The announcement of Reed's discovery was made before the Pan-American Medical Congress held in Havana in February 1901.

Long before this, however, Smith, Kilbourne and Curtice of the federal bureau of animal industry gave prominence to the insect-vector theory by proving for the first time that specific insects convey specific infectious materials from the sick to the well.

In 1933, the Republic of Cuba issued a postage stamp commemorating the work of Finlay, and in 1934, Postmaster General Farley, in his series of stamps of famous Americans, issued a 5-cent stamp bearing the likeness of Walter Reed. William C. Gorgas, surgeon general of the Army at the turn of the century who made use of the discovery of Walter Reed in the building of the Panama Canal, also was honored by a postage-stamp issue commemorating the 25th anniversary of the completion of that important national project.



—After Winthrop Chemical Company, Inc., 1940.

Left to right: Carlos Juan Finlay (1833-1915), Surgeon General Gorgas (1854-1920), Walter Reed (1851-1902).

What Has the AVMA Done for Me?

THE AIMS of the American Veterinary Medical Association have not changed. They are only getting more clear. Lest the present and coming generations lose sight of the Association's hard life and fundamental achievements, it seems necessary from time to time to refresh memories, to remind the doctors that the AVMA baptized a sickly newborn 77 years ago and named it the "veterinary profession." But there were other things to do besides the baptismal ceremony, which took place in New York in the summer of '63. There was a personnel to furnish and a *premier pas* to take—the founding of an educational system where none had existed before.

A profession must have systematically trained men, systematically distributed. What to do was less difficult to plan than how to do it. Two ideas went into the program. The one was to found private veterinary schools similar to the schools of medicine, pharmacy and dentistry which had been sprouting up all over the country, and the other was to establish chairs of veterinary science in the newly created colleges of agriculture. Both plans took root and grew to respectable adolescence. Denizens of the private schools furnished the doctors for 45 years; chartered state associations and passed practice acts; turned out good practitioners, some excellent teachers and research men; manned the national and state disease-control service; and then boldly voted for the founding of a utopian group of veterinary colleges. The chairs in the agricultural colleges went from teaching to research.

Through the years, the AVMA was the faithful, courageous watchman of the realm, guiding, governing, inspiring reforms characterizing the progress of other branches of medical science. If the nation has a marvelous bureau of animal industry, search the biographies of its founders, its commanders, and its personnel for the part they played in maintaining a national association as a bulwark of their enterprise; if we have a good veterinary corps, un-

questionably the best in the world, read the annals of the AVMA for the reason; if our educational system promises to surpass that of any other country of the present time, perhaps the reports of the Committee on Education will tell the story; if the "cattle tick" has been practically exterminated, bovine tuberculosis eradicated, Bang's disease on the way out, if the states are developing better and better regulatory services year after year, the history of the Association will show how all these gigantic projects were managed.

What has the AVMA done for you? It has given you your money, your business and your respectability, everything you have, including the name of your occupation. The question begets another, namely, "What have you done for the AVMA?" Well, under the present set-up—set-up made for you—if you are a member of your local or your state association, that's something of the right sort. But in order that these may have national backing that will aid in improving local situations, you are still delinquent when you do not contribute your name to the membership of the parent of everything veterinary in this North American continent.

If all of the achievements of the veterinary profession have been apparently slow in taking form, a no small part of the cause was the lack of universal action, meaning a too small membership. The profession in which you have to live and work can be no greater than you make it.

Why Revise the Association's Basic Laws?

THE REVISION of constitutions and by-laws of scientific organizations becomes a necessity from time to time. As sciences advance and their practical application changes, so must the rules governing them be changed. Otherwise such documents become topheavy with amendments tacked on to meet current conditions. The AMA re-

wrote its constitution last year and so did the AVMA, not by any means as an idle pastime but as a necessity to iron out many a contradiction brought about by amendments that called for changes in certain articles and sections that were never made in the printed document available for distribution.

Revising such a document is a tough undertaking. It is particularly difficult in our profession with its many diversified branches and its many phases of work: education, sanitary science and police, research, practice and licensure, and commercial production of technical supplies. To set down regulations intended to solidify all these into a workable unit is a task indeed, perhaps an impossibility. The effort, already too long postponed, is nevertheless worth while.

Bang's Disease Situation

A LETTER from a disconcerted member asking for the publication of an article condemning the test-and-slaughter method of handling Bang's disease in his state is but one of the many communications of the same kind we receive. Naturally, the controversy over the relative merits of vaccination and slaughter has its repercussions in the JOURNAL office. The fact, however, that the JOURNAL has not announced an editorial policy on the matter does not signify a lack of interest.

We are keenly aware that Bang's disease control is a two-sided question widely debated in and outside of the veterinary profession, which leads us to agree with *Hoard's Dairyman*, whose editor says, "It would seem that no definite stand can be taken either pro or anti but an open-minded consideration of the whole business leaves one with a feeling that there should be room for some of each—at least for a while." These few well-chosen words we quote as a pattern for our thoughts. Bang's disease and brucellosis in animals other than cattle impose a great problem for the federal and state livestock sanitary services, both of which are carefully feeling

their way to the decided advantage of all concerned without making commitments that may be difficult to overcome. Certainly, while research and observation on a large scale are being made, there can be little good derived from heated arguments among ourselves. These would tend more to throw the whole program out of balance than to solve it.

The Veterinary Service and the Present War

THE VETERINARIANS of all countries at war and of neighboring countries supplying food to the belligerents are mobilized to maintain food production and to conserve the animals of the military services, which, contrary to prevailing impression, are being used in large numbers. According to authentic information, the modern division is organized to contain between 3,000 and 4,000 horses and mules and, in certain instances, as many as 10,000. In the newspapers these are called mechanized troops.

Faced with low animal production on account of the tremendous drain upon farm labor and farm animals, there has been no time in the history of this world when animal conservation was as important as it is now. The veterinarians of England and Scotland have even organized a well-deployed service to protect animals against air raids. With but a few exceptions all veterinarians have joined the movement, the object of which is to provide care for injured and exposed animals promptly.

In the United States, the European war is having the opposite effect. It is creating food surpluses owing to lack of the export trade upon which the American farmer depends for an outlet for products valued at many millions.

Wallaces' Farmer says that when hogs eat the fragments of clay pigeons shot into pastures by trapshooters, they are apt to suffer degeneration of the liver, but this excellent farm paper forgets to add that a veterinarian down at Urbana (Ill.) discovered the fact.

WITH THE EDITORS

SCHLOTTHAUER's paper on diseases of the brain of dogs is a welcome addition to our meager knowledge of the subject. The broad discussion of the etiological factors involved is particularly informative. The author's statement referring to the localized lesions in the cerebrum associated with nervous manifestation brings to mind work in progress elsewhere which indicates that removal of the brain areas involved cures chorea. However, the mechanism by which the removal of the areas governing the muscular apparatus is influenced by the operation in such a way as to establish coördination in the twitching muscles is as difficult to explain as the results reported are extraordinary.

» » »

The report of Harwood and Guthrie on tapeworms in chickens is discouraging, since their work indicates that a dependable and safe taeniocide for chickens is lacking. Of the 250 agents discussed and tested, only one—lead arsenate—proved reasonably efficient, but its toxicity precludes its general use, the authors say.

» » »

H. C. Smith's article, "The Relation of Bacterial Foci to Canine Pathology," reminds us of those disconcerting and secretive noises which develop in our automobiles from time to time. Mechanics say that many of the "rattles" are *telegraphed*—which means that a noise that may appear to be emanating from the motor may have its source in the rear assembly. This situation may easily be compared to the obscure skin disorders, lamenesses, baffling fevers and renal symptoms due to focal infections. The causal factors (infections) may easily escape a cursory examination, and the results, based on the

treatment of the symptoms, are not successful.

» » »

Though vesicular exanthema of swine is confined to California, it behooves every veterinarian whose duties bring him in contact with swine to read the short pictorial article by B. B. White. This malady is serious in that it can not be distinguished grossly from foot-and-mouth disease.

» » »

Two new findings are reported for the first time in American veterinary literature. One is the announcement by W. J. Hall *et al* of the propagation of fowl-leucosis virus on the chick embryo. The other is a report of a case of *Coccidioides immitis* infection in a dog. This infection has previously been reported in humans, cattle and sheep.

» » »

The use or misuse of abortion vaccine (bovine) with regard to the control or eventual eradication of Bang's disease is the subject of much discussion. This situation as viewed in the State of Wisconsin is depicted by W. Wisnicky in "Vaccination for Bang's Disease."

» » »

Ralph B. Little says that the exaggerated demands on the udders of our modern dairy cows predispose that organ to infection. This idea appears to be substantiated by the relative absence of mastitis in cows regulating their own milk production. Two other ideas worthy of serious consideration are the possibility of first-calf heifers' being sources of infection and the improvement of the bacteriological methods by using the first milk drawn as the inoculum rather than discarding the first few streams.

CURRENT LITERATURE

ABSTRACTS

Phenothiazine in Esophagostomiasis in Sheep

In doses of 0.15 Gm. (1.5 gr.) per pound of body weight following copper sulfate and starvation for 24 hours, phenothiazine is excellent treatment for esophagostomiasis of sheep. Better results, however, were obtained by giving 0.2 Gm. (3 gr.) per pound of body weight and by increasing the period of starvation. Doses of 0.4 Gm. (6 gr.) per pound of body weight without copper sulfate stimulation were resultful in adult sheep but not in lambs. The tendency to constipation in treated sheep is pointed out as one of the factors which delay the drug from passing rapidly back to the large intestine, thus permitting a larger proportion of the drug to be fragmented and absorbed.

The dose rate in the treatment of stomach worms (*Hæmonchus contortus*) is lower. A dose of 0.045 Gm. per pound of body weight given after a stimulating dose of copper sulfate (2 cc. of a 10 per cent solution) proved to be an effective stomach-worm vermifuge and the autopsies show that but few worms were left. [F. H. S. Roberts. *The Value of Phenothiazine in the Treatment of Esophagostomiasis in Sheep. The Australian Veterinary Journal, re* (1939), p. 237.]

Vitamin E in Fowl Paralysis

In an interesting study the author reviews all of the possible causes of fowl paralysis, a term he applies to all functional impotencies without reservation. The neurolymphomatosis of Marek is specially studied in view of determining the possible relations which may exist between the intestinal lesions always found in this disease and the evolution of the paralysis.

After a series of observations which were

nearly all made at the *Station d'Étude* for poultry diseases, the author reports the constancy of intestinal lesions due to the alimentation and the presence of helminths in considerable numbers.

Taking into account the preponderant influence of nutrition on the alterations of neurolymphomatosis, he used wheat germ oil (vitamin E) recommended by Pacini in a flock badly afflicted with paralysis. Favorable results were obtained. The mortality of 6 per cent dropped to 3 per cent after the treatment was given. The wheat germ oil was given either by the mouth or hypodermically. The evident relationship between faulty alimentation and the paralysis is emphasized. [R. Marquet. *Thèse, Paris, 1939. Abstracted in Recueil de Médecine Vétérinaire, cxvi, March 1940, p. 141.*]

Nicotinic Acid in the Treatment of Canine Blacktongue

Recent investigations by research workers have solved the problems of the etiology and control of canine blacktongue. At the present time, nicotinic acid is considered a specific in the control and treatment of the disease. Nicotinic acid is also a specific in treating pellagra in man.

Goldberger was the first to suggest a definite relationship between blacktongue of dogs and pellagra of man. His research indicated that dried pig's liver contains definite blacktongue preventive and curative factors.

The value of nicotinic acid in blacktongue has been demonstrated rather recently. Elvehjem and associates of the University of Wisconsin did considerable work on this subject and reported that either nicotinic acid or nicotinic acid amide was effective in curing the disease. Although

nicotinic acid is not new, this was the first time it was used in treating pellagra.

Nicotinic acid is a vitamin and is an integral part of the vitamin B complex. Chemically it is known as pyridine-3-carboxylic acid. When the diet is deficient in this acid over a period of time, we have symptoms of blacktongue appearing. These are anorexia, loss of weight, weakness, listlessness, and soreness of the mouth. Finally, we have a characteristic dejection, even prostration, with the mucous membranes presenting a fiery red appearance. Goldberger and Elvehjem were both able to feed a blacktongue-producing diet to dogs and produce the disease artificially. Elvehjem's nicotinic acid-free blacktongue-producing diet was as follows:

White cornmeal	73 per cent
Protein in form of purified casein	18 per cent
Cottonseed oil	5 per cent
Cod liver oil	2 per cent
Calcium carbonate	1 per cent
Calcium phosphate	1 per cent

When the disease was established, injections of nicotinic acid quickly resulted in improvement and cure.

Nicotinic acid may be given either intramuscularly or orally. It has been determined that doses of 1.5 mg. per kilogram (2.2 lb.) of body weight are highly effective in curing canine blacktongue and are harmless.

Some pharmaceutical houses make a practice of combining liver extract with nicotinic acid. They believe, and perhaps rightly so, that this combination is more efficacious and enhances the specific curative factor due to ingredients of liver which assist in overcoming the anemia which usually accompanies blacktongue, also that it helps promote normal muscular tone of the body and gastrointestinal tract, and aids in restoring to normal the deranged metabolic processes.

The following pertinent observations on the use of nicotinic acid in the treatment of canine blacktongue are made:

The dosage is 1.5 mg. per kilogram of body weight.

The drug is a valuable addition to veterinary pharmacology and therapeutics and is

of great practical value in controlling and treating a serious disease of dogs.

Nicotinic acid is harmless in proper dosage.

Canine blacktongue and human pellagra are definitely related and have the same causative factor, namely a deficiency of vitamin B in the diet, particularly a lack of nicotinic acid.

Nicotinic acid may be given either orally or intramuscularly. [Capt. W. F. Collins, V. C., U. S. A. *Veterinary Corps Bulletin*, April 1940.]

The Minimum Lethal Dose of Selenium, as Sodium Selenite, for Horses, Cattle and Swine

Since selenium was discovered in certain plants of the North Central States and incriminated in the causation of alkali disease of live stock in that region, numerous experiments on the toxicity of this element have been made. The continuous feeding in most of these experiments produced subacute and chronic forms of the intoxication. The acute type of poisoning was, however, produced with large single doses. Doses of 1.5 mg. per pound of body weight killed 75 per cent of a group of rats in 48 hours (Franke and Moxon, 1936). The fatal dose for rabbits, given orally, was 1.5 to 2 mg. per pound of body weight (Smith, Stohlgman and Lillie, 1937).

The minimum lethal dose for horses, mules, cattle and swine was studied at the Animal Disease Station, Beltsville, Md. The dose for horses was determined with exactitude. Given 3.6 mg. per pound of body weight, three horses died in 24 hours or less. One mule out of three survived doses of 1.5 mg. per pound of body weight. The survivor, after developing symptoms of acute selenium poisoning, recovered in a week. The m.l.d. for horses and mules was, therefore, set at 1.5 mg. per pound of body weight.

The symptoms of acute selenium intoxication are loss of appetite and thirst, accelerated pulse and respiration, normal or slight rise in temperature, dilated nostrils,

fixed stare and standing still in the stall. As death approaches, respiration is convulsive and labored. Blood samples show no hemolysis. Death is probably due to asphyxiation owing to reduced respiratory capacity of the blood. Dudley (1936) isolated a "protein-like selenium complex" in the red cells, but found none in the serum, plasma and fibrin. Were that possible, the dose of selenium should be calculated in terms of blood volume instead of body weight.

The tolerance of cattle and swine is greater than that of horses and cattle. The m.l.d. for hogs is 6 to 8 mg. per pound of live weight, and for cattle, 4.5 to 5 mg.

Five horses and three mules, one calf and four cows, and seven hogs were used in the experiment. [W. T. Miller, U. S. Bureau of Animal Industry, and K. T. Williams, U. S. Bureau of Plant Industry. *Journal of Agricultural Research*, lx (Feb. 1940), pp. 163-173.]

Immunological Reactions in Intestinal Helminthiases

Thanks to improvements in technics and in the choice of antigens, the parasitic diseases capable of being detected by immunological reactions have become quite numerous. However, in regard to intestinal helminthiases, the results obtainable are far from satisfactory. Complement fixation and agglutination tests are not always dependable. Allergic reactions from the use of antigens (subcutaneous, intradermal, epidermal or conjunctival) give more interesting results.

The presence of antibodies is not regular, even in parasitisms where the worm at a certain moment of its life cycle circumnavigates the tissues of the host. To produce antibodies, intense and prococious, it is necessary that the parasite live in close contact with the host. From the viewpoint of richness of antibodies in the blood serum, the author classifies worm parasitisms into three groups, namely: a) parasitisms of the blood and tissues (trypanosomiasis, echinococcosis, filariasis); b) helminths in the

digestive canal which accomplish their evolution by migrating through the tissues (ascariasis); and c) diseases determined by parasites which live on the surface of the intestinal mucous membrane or on the common integument (taenia, acaridia, sarcoptes . . .). In the richness of antibodies which determine the degree of allergic reactions, these three groups are arranged on a descending scale. [F. Schoenaers. *Les Réactions Immunologiques dans les Helminthiases Intestinales*. Abstracted from *Annales de Médecine Vétérinaire in Recueil de Médecine Vétérinaire*, cxvi, March 1940, p. 138.]

Mouldy Hay a Cause of Broken Wind (= Heaves) in Horses and Abortion in Cows and Mares

Where hay is not harvested, broken wind in horses does not occur. It is, therefore, logical to suppose that mouldiness in hay is a cause of the chronic alveolar emphysema known as heaves. This was confirmed in Venezuela, where the author observed that the ailment seldom occurs in horses grazed throughout the year and fed whole green maize (= corn) when brought in to work. He also observed that in North Cardiganshire (Scotland) the incidence of heaves has been rare since hay has been stored in modern buildings instead of the badly ventilated, stone buildings of former times. Where these unfavorable conditions have existed, the author has seen stables where few of the horses over 5 years old escaped having the disease. Prof. Wm. Williams classified broken wind as a dietetic disease.

The same importance is attached to mouldy hay as a cause of abortion in cows and mares. Several outbreaks obviously due to that cause are discussed. [Edward Morgan, M.R.C.V.S., D.V.H. *The Veterinary Journal*, xcvi (Jan. 1940), pp. 51-53.]

The tuberculous chicken is an undesirable member of the farm economy and should be eliminated.—Feldman in *Poultry Practice*.

Coccidial Enteritis

All cases of diarrhea where the feces are mixed with blood and coccidia can be detected are designated as "red dysentery." The disease is frequently of enzootic character, several animals becoming ill simultaneously in the same pasture. Animals between the ages of 6 months to 2 years are most susceptible. Female cattle are more susceptible than males. Colts never contract the infection although kept under identical conditions. The disease usually occurs among animals on pasture. The author has observed only one outbreak in stabled animals.

The outstanding symptoms are as follows: The disease is ushered in with a diarrhea. The feces are liquid, putrid, mixed with mucus and later have the appearance of urine. As early as the second day, blood may appear in the feces and frequently in the form of clots varying from the size of a pea to that of an egg. The bowels move frequently and the severe straining may lead to a rectal prolapse. Infected animals stand with head lowered, back arched, tail raised, and confine themselves to a more or less secluded part of the pasture. If placed in the stable, they lie down most of the time, rise only with difficulty and later are too weak to stand. The rapid loss of strength is astonishing.

Rumination and desire for food are diminished or entirely absent. The muzzle is dry and the horn, ears and extremities are cold. The eyes rapidly sink into their orbits. Meningitis-like symptoms with a tendency to move forward are observed later; this is probably due to an anemia of the brain. The temperature varies between 38.5° and 40° F. and the pulse rate is increased, often to 100 per minute. Breathing is rapid. Emergency slaughter may be necessary as early as the third day, especially in young animals.

The period of incubation is three to six days and the course of the infection varies from three days to three weeks. With regard to differential diagnosis, abscess in the abomasum and intestine, intestinal tuberculosis and diarrheas of all types must be

considered. The prognosis is favorable. In this territory (Switzerland) the mortality is about 6 per cent.

In the treatment of this condition, infected animals should be removed to a stable. The feed should consist of hay, ground oats and a few boiled potatoes. Rice water should be given in place of the regular drinking water. The author claims to have had good results with the following treatment: animal charcoal 400 Gm. (13.3 oz.) and opium 10 Gm. (155 gr.), which is divided into two doses and given in rice water. Later catechu 50 Gm. (1.6 oz.) mixed with two raw eggs three times daily is employed. In other cases 1 per cent creolin in rice water and methylene blue 2 Gm. (30 gr.) three times daily are given. If the heart's action is weak, red wine by the mouth and caffeine subcutaneously are administered. Hydrochloric acid and tincture of veratrum are indicated if rumination is absent. It is very important that infected animals eat a little hay as soon as possible. In cases of rectal prolapses, a tobacco-pouch suture of heavy silk is recommended. Severe cases may be treated locally. Astringent solutions to which creolin or tincture of opium have been added are useful. In general, the postmortem changes are: general anemia and inflammatory changes in the intestinal mucous membranes, particularly the rectum. The omasum is always exceedingly hard and dry, simulating a bowling ball.

If infected animals are killed during the early stages of the disease, the meat is edible. There are no cases on record (Switzerland) where persons have become ill following the ingestion of such meat. In this territory the disease is caused by the drinking of contaminated water. On the southern slope of the Alps the disease is much more prevalent than on the northern slope because of the poor natural water supply. During the dry season animals are forced to drink cistern water. Coccidiosis in cattle has disappeared from many districts since the water supply has been improved. [Franz Waelchli. *Practical Ex-*

periences with *Enteritis Haemorrhagica Coccidiosa*. *Schweizer Archiv fuer Tierheilkunde*, lxxxii (January 1940), pp. 7-11.]

Pyrethrum in Verminous Bronchitis in Sheep

Intratracheal injection of pyrethrum suspended in oil for the treatment of verminous bronchitis in sheep was the subject of a thesis presented for the doctorate degree by Guerit in 1933. The oil is titred to 5 mg. per cubic centimeter. The dose injected was 5 to 10 cc. The embryos of *Dichtyocaulus* disappeared in five to six days after the first injection. The sheep quit coughing in four to five days and began to gain flesh as if cured. No untoward sequels were observed. [M. Guerit. *Les Pyrethrines. Essai de Traitement de la Metastrongylose Ovine*. Thesis abstracted in *Recueil de Médecine Vétérinaire*, cxvi, March 1940, p. 140.]

Veterinary Aspects of National Nutrition

The part the veterinarian plays in furnishing an ample nourishment for a nation falls under five main categories, namely: 1) Administrative control of animal diseases; 2) the food-inspection service; 3) The control and treatment of sporadic or other animal diseases on the producers' premises; 4) Colonial work; and, 5) Positive policy of disease prevention.

Preventing the transmission of animal diseases to man is a well-known objective of a veterinary service but the increase in the quantity of food (meat, milk, eggs) where the incidence of disease is curtailed prevents shortage of food as well. The need of improving the food-inspection service is obvious. Unwholesome food sold for public consumption is seized and destroyed and general quality is maintained.

The local veterinarians save perhaps \$90,000,000 worth of property of British livestock owners and they insure a better, bigger and healthier livestock population.

They could do still more if called upon to do so. The colonial veterinarians who work mainly in disease-control work are a great aid to animal husbandry. Their work has an important bearing not only upon the nutrition of the natives but also that of Britain. The veterinary officer of the colonies is "an indispensable keystone." No other service plays a more impressive and important function.

Disease prevention is, however, the crowning function of the veterinary service. Physicians, biologists, sociologists and other men of science are making the public aware of the importance of health attained through civic activities. Among those engaged in the production of food stuffs, the significance of housing, breeding, rearing, feeding, exercise and management is embraced. Much of the production of animals on British farms has been wasted by lack of attention to general management and in the veterinary colleges too much attention has been paid to horses, dogs and cats and too little to the food-producing animals. Denmark, Germany, Italy and Russia are far ahead of us (England) in their veterinary control of animal health and disease. In the United States, the veterinarian plays an even greater part than in Europe. In the dominions, self-governing dependencies, and some of the colonies, the veterinary services are used to better advantage than at home. Moreover, the veterinarians may have to cope with the malicious spread of disease. In short, veterinarians contribute to improvement in the levels of nutrition and thus in the health of the general public. The authors emphasize, however, that general improvement in the health of crops, animals and mankind has not been forgotten. [Wm. C. Miller, M.R.C.V.S., F.R.S.E. *Veterinary Aspects of National Nutrition*. *The Veterinary Record*, li (June 3 and 10, 1939), pp. 705-726.]

A major problem of the moment is the surplus of food on the farms and the shortage in many a "tummy."

BOOK NOTICES

Dutch Vet

Dutch Vet is an absorbing story of the professional life of a Dutch veterinarian. The hero is Dr. Vlimmer, who conducts a mixed practice and, as is customary in European countries, holds a part-time job as meat inspector at the local abattoir. Vlimmer is a competent veterinarian whose profound confidence in the importance of his profession impresses the reader.

Throughout his career Vlimmer was beset with marital troubles that were intensified by local religious prejudices. The novel abounds with interesting cases and the treatments are modern. Most of the hero's clients are peasants, and the way he humors them is the typical strategy of a successful practitioner. Needless to say, Vlimmer wins the complete confidence of his clientele.

The death of a cow or other meat-producing animal in the Netherlands is an economic catastrophe. Meat is meat. Every bit of it is salvaged. When animals are about to die, the butcher is called in to attend the "emergency slaughter" while the veterinarian decides upon the fitness of their meat for human food. The slaughtering must be humane. In fact, humane destruction of animals is an obsession among the Dutch peasants. In this country, where meat is plentiful, such practices lie in the future. Cleverly woven into the text are such diseases as anthrax, tuberculosis, foot-and-mouth disease, hog cholera, obstetrical accidents and "water on the heart" (= traumatic pericarditis).

One of the high points of Vlimmer's professional work is a radical operation for the removal of a metallic object from a cow's heart. His audience, a crowd of skeptical peasants, is dubious about the outcome of such a bold intervention and the doctor himself is none too sure about his diagnosis until the penetrating wire is located and

proudly displayed before the astonished spectators.

The veterinarian who likes to read books about the lives of his colleagues will appreciate *Dutch Vet* and the thoughts the author attempts to bring out about our sturdy profession. Quoting: "He [Vlimmer] felt at rest and content. Much could happen to him but there remained one of great value, something he possessed and which could not be taken from him—his hard, honest and fine profession." [*Dutch Vet*. By A. Roothaert. Translated by Fernard G. Renier and Anne Cliff. The Macmillan Company, New York. 437 pages. \$2.50.]

Your Health

Your Health is a booklet designed not only to catalogue the main medical exhibits of the New York World's Fair but to make the assemblage a permanent benefit to mankind by founding a museum of health in the City of New York. The display which was developed and sponsored by the temporary organization known as the American Museum of Health, Inc., is not the result of spontaneous effort in the building of a great American fair but, on the contrary, represents the accumulated work of ten or more years carried out for the expressed purpose of impressing the public on the importance of scientific medical knowledge in promoting human welfare.

Death can be postponed and the average span of life can be lengthened mainly through a better general understanding of medical facts and willingness on the part of the individual to apply them. Public support of measures required to control communicable diseases needs the addition of individual self-preservation to accomplish the aims of medical science. In short, known facts must be put to work not only by the physician but also by his prospective patients—the general population. Quoting: "While waiting for someone to discover

the function of the pineal gland, we can learn how to avoid abuse of the pancreas." Thus, by utilizing medical knowledge, the death rate in the United States was decreased from 35 per 100,000 in 1830 to 11 per 100,000 in 1929. This story is told by a revealing illustration entitled "The Retreat of Death."

THE AVMA EXHIBIT

The book is divided into ten general headings which are broken down into 46 special subjects—the exhibits—among which is "Veterinary Medicine," the exhibit of the American Veterinary Medical Association and Allied Interests.

Members will be interested to learn that during 1939 the attendance (at the building) was 7,509,900. The Sunday average was 66,507.

The two pages devoted to this exhibit tell the story of the profession's achievements and of its present labors, including a paragraph complimenting the scientific methods provided for the care of sick and injured pets.

Tick eradication as an example of insect control, bovine tuberculosis eradication as a means of purifying the milk supply, equine encephalomyelitis as a disease communicable to man, the costly raids of hog cholera and its control by vaccination, the removal of unwholesome meat from the channels of trade by the meat-inspection service, and the value of meat as a food are pointed out to show the veterinarian's place in the march of medicine.

The space occupied by this exhibit is 589 square feet. Obviously, no better picture of the veterinary service ever was drawn or seen by so many people.

The American Museum of Health expresses its deep appreciation to the "scientists, educators, and laymen without whom these exhibits could not have been realized." In the list of "Sponsors and Contributors," 34 of them, are such familiar names as "American Dental Association," "American Medical Association," "American Public Health Association," "American Veterinary Medical Association," "American Social Hygiene Association,"

"Rockefeller Foundation," Lederle Laboratories," "Eli Lilly & Company," "E. R. Squibb & Sons," "United States Department of Agriculture," "Winthrop Chemical Company," and others whose work is instrumental in the progress of the present medical set-up. [*Your Health, a Guide to the Medicine and Public Health Building. Edited by George McAneny, president, American Museum of Health. American Museum of Health, Inc., 30 Rockefeller Plaza, New York. 96 pictorial pages.*]

Streptococci

Streptococci is an outstanding classic in bacteriological research on the genus *Streptococcus* with special reference to the species concerned in contaminating the milk supply and in producing disease of the bovine udder. The facts contained are the result of more than ten years of intensive, large-scale study of species which, the authors declare, need reclassification. The history of streptococcal taxonomy and the characterizations which led to the identification of more than 30 species since Billroth (1874) coined the name "*streptococcus*" is fascinating information to readers who like to "get at the bottom of things," and is certainly important to investigators in that field of preventive medicine.

If the reclassification was found necessary in elucidating the work carried out, the reasons given for doing so are not lacking in any instance. The detailed description of hemolytic and nonhemolytic streptococci carries the reader through 45 illustrated pages of differentiations fundamental in human and veterinary medicine. Controversies of extremely practical importance in milk inspection, though veiled in the language of the laboratory technician, are easily singled out.

An absorbing chapter is that on the history of our knowledge of the streptococci of milk. This chapter takes one through the observations of Pasteur, Lister, Nocard of Alfort, Klein of Vienna, down to Davis of Chicago, who made up the chain of facts furnishing the groundwork for a more scientific approach to the relations between

the streptococci of the cow's udder and the diseases of the human being.

"Distribution of Streptococci in the Udders of Individual Cows," "Streptococci in Pasteurized Milk," and "Streptococci in the Throats of Dairy Employees" are titles for chapters containing a wealth of meticulously tabulated material which at once shows the extent of the work reported and the pains taken to place it on record.

Streptococci is a book for the bacteriologist, physician, veterinarian, hygienist, health officer and, most certainly, one that should be regarded as indispensable for the expert milk inspector. [*Streptococci*. By William D. Frost, Ph.D. (Wisconsin), Dr.P.H. (Harvard), emeritus professor of agricultural bacteriology, University of Wisconsin, and Mildred H. Engelbrecht, Ph.D. (Wisconsin), assistant professor of bacteriology, University of Wisconsin. 172 pages (8" x 11"). 120 photomicrographs. Willdof Book Company, Madison, Wis.]

Dogs of All Breeds

Comes a booklet containing color pictures of all known breeds of dogs—114 of them. This array of pictures is a reminder of the flair required to avoid embarrassing mistakes in identifying the many breeds of dogs filing before the eyes of the small animal practitioner. The ability to recognize at a glance the few breeds of the other domestic species (horses, cattle, swine, etc.) is a simple accomplishment compared with the apperception needed to spot all of these many breeds of dogs without committing errors. To know on sight a Keeshond, Saluki, Schipperke or Lhasa Terrier, for example, not to mention a score or more of even less common breeds, is a faculty acquired by experience or by the study of good pictures such as this booklet contains, pictures of well-selected specimens and well-posed dogs counterfeited in nature's colors.

The breeds are classified into working dogs, sporting dogs, terriers, toys and non-working dogs. Interspersed among these pictorial pages is reading material on the processing of a popular brand of canned

dog food, a two-page spread on tricks and another on health hints and general care. Contrary to a former habit of dog-book writers, there is no mention of disease and treatment. A useful booklet for office and waiting room. [*Dogs of the World*. Rival Packing Company, Chicago. 40 pictorial pages. Price, 25 cents.]

American Veterinary History

American Veterinary History, Part II, is a brief account of the North American veterinary schools of the past that did not survive. The history covers the period from 1852, when Robert Jennings established a nonviable veterinary school in Philadelphia, until the last private one closed in 1927. There were 51 such schools founded during that 75-year period. Some were very short lived while others lived on doing excellent work for as long as 45 years. The author describes briefly each one of these institutions, giving due credit wherever credit was earned, and criticizing severely those which were little else than diploma mills and quackish colleges. The American Veterinary Review and the Journal of the American Veterinary Medical Association are described, and a good history is given of the Association itself and its predecessor. The story of the United States Veterinary Medical Association is clearly told in several pages. This part of Beirer's historical sketches is pleasant reading and although brief it is the most complete documentation of that part of veterinary history yet published. [*American Veterinary History, Part II*. By Bert W. Bierer, D.V.M., Baltimore. 60 multigraphed pages. Price not furnished.]

The greatest famine in Europe since the Middle Ages is the grim picture outlined by food experts, unless the war ends before the coming of winter.

Michigan dairy farmers discard 25 per cent of their animals each year. Fifty-two per cent leave home on account of poor production.

THE NEWS

AVMA Activities

Huddleson Awarded Twelfth International Veterinary Congress Prize

In recognition of his outstanding contributions to the field of brucellosis research, I. Forest Huddleson (Mich. '25), research professor in bacteriology at Michigan State College, East Lansing, Mich., was awarded the Twelfth International Veterinary Congress prize at the opening session of the Washington convention, August 27. The presentation was made by H. W. Jakeman, chairman of the Executive Board.

Dr. Huddleson was born at Murphysville, Ky., in October of 1893, and moved to Oklahoma in 1907. He was graduated from Oklahoma State College in 1915, with a B.S. degree as a chemistry major. In 1916, he was awarded an M.S. degree in bacteriology at Michigan State College. Following overseas



I. Forest Huddleson

service in the World War, he returned to Michigan State College and, in 1925, obtained a D.V.M. degree. He was awarded a Ph.D. degree by the same institution in 1937.

Dr. Huddleson served as a special expert in the U. S. Public Health Service for six months in 1929, studying undulant fever in Tunis and Malta, and under the Rockham research foundation he studied brucellosis in Malta in 1937 and 1938.

Committee Chairmen Named for 1941 Meeting

On July 27, at a meeting of the Board of Directors of the Indiana Veterinary Medical Association in coöperation with the officers of that association, the representatives of the biological and pharmaceutical firms and the president and secretary of each sectional association, the following committee chairmen were appointed for the 78th annual meeting of the AVMA, to be held in Indianapolis, Ind., August 18-22, 1941:

General Chairman: J. L. Axby, Indianapolis.
Ass't. General Chairman: R. E. Kepner, New Castle.

General Secretary: C. C. Dobson, New Augusta.
Hotels: Frank H. Brown, Indianapolis.

Public Relations: Walter K. York, Indianapolis.
Entertainment: J. C. Schoenlaub, Indianapolis.



This is the group that convened at the Severin Hotel in Indianapolis, Ind., on July 27 to make initial plans for the 78th annual meeting. Seated (left to right): Earl S. Hinkle, Centerville; Charles C. Dobson, New Augusta; Gilbert E. Botkin, Marion; Raymond E. Kepner, New Castle; J. L. Axby, Indianapolis; L. A. Merillat, Chicago, Ill.; J. C. Schoenlaub, Indianapolis. Standing (left to right): W. A. Sullivan, Indianapolis; J. L. Kixmiller, Indianapolis; Harold L. Decker, College Corner, Ohio; D. D. Baker, Wabash; A. C. Spivey, Thorntown; R. C. Vermillion, Indianapolis; Joseph Cripe, Indianapolis; J. J. Arnold, New Castle; Edward Pentecost, Indianapolis; O. B. Curry, Morristown; Paul T. White, Indianapolis; C. Harvey Smith, Crown Point; Hall W. Demsey, Huntington; H. W. Brown, Fort Wayne; F. H. Brown, Indianapolis; Walter F. Smith, Valparaiso.

Commercial Exhibits: J. L. Kixmiller, Indianapolis.

Educational Exhibits: W. A. Sullivan, Indianapolis.

Ladies' Entertainment: Mrs. J. C. Schoenlaub, Indianapolis.

Banquet and Dance: G. E. Botkin, Marion.

Alumni Dinners: D. D. Baker, Wabash.

President's Reception: H. W. Demsey, Huntington.

General Chairman of Clinics: Edgar D. Wright, Fort Wayne.

Large Animal Clinic: C. C. Donnelson, Indianapolis.

Small Animal Clinic: H. W. Brown, Fort Wayne.

Sheep and Swine Clinic: L. P. Doyle, Lafayette.

Poultry Clinic: F. C. Tucker, Claypool.

Parking of Automobiles: R. J. Hoskins, Indianapolis.

Restraint and Anesthesia: C. Harvey Smith, Crown Point.

F. M. Wilson Elected to Executive Board

F. M. Wilson (Chi. '11) of Mechanicsville, Iowa, has been elected to represent District 5 (Iowa and Minnesota) on the Executive Board.

Dr. Wilson's ability to deal with association affairs is evidenced by his service as president of the Iowa state, Eastern Iowa, East Central Iowa and Cedar Valley associations. He also has worked on numerous committees of these organizations and is a delegate to the House of Representatives. He is probably best known for his part in building up the annual clinics of the Eastern Iowa Veterinary Association, Inc. The first of these clinics was held in 1931 at Mechanicsville, and he provided the facilities for it. Each succeeding year the Mechanicsville clinic grew in popularity, until finally it was found necessary to stage the event in Waterloo, which is better equipped to accommodate the large crowds it now attracts.

Aside from his busy professional life, Dr. Wilson has taken an active part in the civic affairs of his community, having served as mayor of Mechanicsville and member of the school board, city council, Masonic lodge and American Legion. He also is a member of Phi Zeta.



F. M. Wilson

Haigler to Represent AVMA at Southern VMA Meeting

S. W. Haigler of St. Louis, Mo., will speak on small animal medicine, on behalf of the national association, at the annual meeting of the Southern Veterinary Medical Association in Birmingham, Ala., November 13-15.

George Rousies of French Army Visits Executive Office

Among the recent visitors at the executive office was George Rousies, veterinary reserve officer of the French Army who has been in the United States since last summer inspecting horses purchased for exportation to France. The misfortune that has befallen his native country along with the uncertainty of his status there and here is the difficult situation he has to face.

APPLICATIONS

First Listing*

BIERER, BERT WORMAN

2610 Wycliffe Rd., Parkville, Baltimore, Md.
V.M.D., University of Pennsylvania, 1934.
Vouchers: F. L. Vinson and H. M. Kroll.

BONE, J. KENNETH

4321 N. Pulaski Rd., Chicago, Ill.
B.V.Sc., Ontario Veterinary College, 1938.
Vouchers: A. G. Misener and Eugene B. Ingmand.

BOTTEMA, MARK

R. 1, Bridgeport, Ind.
D.V.M., Indiana Veterinary College, 1917.
Vouchers: John L. Kixmiller and W. A. Sullivan.

BOWMAN, SID E.

Odon, Ind.
D.V.M., Indiana Veterinary College, 1911.
Vouchers: J. L. Axby and W. A. Sullivan.

BROWN, WILBUR L.

Rt. 8, Box 385, Fresno, Calif.
D.V.M., Colorado State College, 1917.
Vouchers: W. L. Curtis and John L. Tyler.

BUNYEA, HUBERT

Pathological Division, B.A.I., Washington, D. C.
D.V.M., U. S. College of Veterinary Surgeons, 1918.
Vouchers: L. T. Giltner and W. B. Shook.

CATEY, OSCAR M.

Modoc, Ind.
V.S., Indiana Veterinary College, 1904.
Vouchers: John L. Kixmiller and J. L. Axby.

CATT, WILFRED E.

Arlington, Ind.
D.V.M., Indiana Veterinary College, 1916.
Vouchers: J. C. Schoenlaub and G. E. Botkin.

*See July 1940 issue, page 73.

- DAPSON, HAROLD EUGENE**
418 W. Housatonic St., Pittsfield, Mass.
V.M.D., University of Pennsylvania, 1930.
Vouchers: Alden H. Russell and Sidney M. Martin.
- DWYER, JAMES EUGENE**
446 Federal Bldg., Salt Lake City, Utah.
D.V.M., Ohio State University, 1914.
Vouchers: H. H. Cohenour and E. D. Leiby.
- EHLLENFELDT, JOHN**
Waterloo, Wis.
D.V.M., Chicago Veterinary College, 1918.
Vouchers: James S. Healy and Hugh E. Mullen.
- ELROD, ROY WILSON**
430 Chestnut St., North Vernon, Ind.
D.V.M., Indiana Veterinary College, 1910.
Vouchers: J. C. Schoenlaub and S. F. Gaynor.
- ERWIN, FRANK BARKLEY**
7119 Ridge Blvd., Chicago, Ill.
D.V.M., Kansas City Veterinary College, 1916. Vouchers: L. A. Merillat and Eugene B. Ingmand.
- FISH, L. O.**
Spencer, Ind.
D.V.M., Indiana Veterinary College, 1916.
Vouchers: J. L. Axby and W. A. Sullivan.
- FORTUNE, LEO A.**
1235 State St., Ogdensburg, N. Y.
D.V.M., Cornell University, 1929. Vouchers: Wm. A. Hagan and Herbert L. Gilman.
- GAMBREL, EARL T.**
Byron, Ill.
D.V.M., Chicago Veterinary College, 1912.
Vouchers: L. A. Merillat and Eugene B. Ingmand.
- GAY, WILLIAM JAMES**
Antioch, Ill.
B.V.Sc., Ontario Veterinary College, 1940.
Vouchers: A. G. Misener and Eugene B. Ingmand.
- HETHERINGTON, JOHN LAYTON**
403 S. College Ave., Bloomington, Ind.
D.V.M., Indiana Veterinary College, 1911.
Vouchers: J. L. Axby and John L. Kixmiller.
- KAVANAUGH, PAUL CARL**
1232 Washington St., Cape May, N. J.
V.M.D., University of Pennsylvania, 1940.
Vouchers: Eugene B. Ingmand and A. Henry Craige, Jr.
- KOBERG, CHARLES W.**
Box 295, San Angelo, Texas.
D.V.M., Colorado State College, 1933.
Vouchers: R. P. Marsteller and James Farquharson.
- LILJEBERG, ELMER N.**
Grantsburg, Wis.
D.V.M., Kansas City Veterinary College, 1915.
Vouchers: James S. Healy and W. Wisnicky.
- MC CONAGHY, THOMAS J.**
Mantua Pike, Woodbury, N. J.
V.M.D., University of Pennsylvania, 1936.
Vouchers: J. Allyn Rogers and J. R. Porteus.
- MARTIN, HOWARD ESHELMAN**
Clarence, N. Y.
D.V.M., Cornell University, 1918.
Vouchers: Wm. A. Hagan and Herbert L. Gilman.
- MOREHOUSE, E. WRAY**
2705 Portland Rd., Salem, Ore.
D.V.M., State College of Washington, 1938.
Vouchers: Charles H. Seagraves and T. Robert Phelps.
- PADDOCK, ARTHUR J.**
101 E. William St., Bath, N. Y.
D.V.M., Cornell University, 1921.
Vouchers: F. F. Fehr and Eugene B. Ingmand.
- PEEPLES, GEORGE FRANCIS**
W. 1530 Mallon, Spokane, Wash.
B.S., D.V.M., State College of Washington, 1935. Vouchers: James D. Nolan and James A. Zimmerman.
- POINDEXTER, CHARLES L.**
301 4th St., Huntington, W. Va.
D.V.M., Indiana Veterinary College, 1912.
Vouchers: S. E. Hershey and C. C. Beall.
- POLLARD, MORRIS**
Animal Disease Station, National Agricultural Research Center, Beltsville, Md.
D.V.M., Ohio State University, 1938; M.Sc., Virginia Polytechnic Institute, 1939.
Vouchers: E. P. Johnson and W. J. Hall.
- RABSTEIN, MELVIN M.**
Live Stock Sanitary Service Laboratory, College Park, Md.
V.M.D., University of Pennsylvania, 1937.
Vouchers: L. J. Poelma and A. L. Brueckner.
- RICHARDSON, OSCAR C.**
445 N. Drexel Ave., Indianapolis, Ind.
D.V.M., Ohio State University, 1925.
Vouchers: W. A. Sullivan and John L. Kixmiller.
- RIESTER, JOHN OTTO**
520 Sutherland, Apt. 3, Indianapolis, Ind.
D.V.M., Indiana Veterinary College, 1910.
Vouchers: J. L. Axby and W. A. Sullivan.
- SASMOR, JAMES A.**
509 Federal Bldg., Indianapolis, Ind.
D.V.M., Cornell University, 1938.
Vouchers: W. A. Sullivan and J. L. Axby.
- SAYLOR, VARNER F.**
Zionsville, Ind.
D.V.M., Indiana Veterinary College, 1914.
Vouchers: J. L. Axby and W. A. Sullivan.
- SPIKES, JAMES S.**
P. O. Box 292, Brownsville, Texas.
D.V.S., St. Joseph Veterinary College, 1909.
Vouchers: Nicholas E. Dutro and W. D. McCuiston.

TIERSTEIN, VICTOR

816 S. San Pedro St., Los Angeles, Calif.
D.V.M., Texas A & M College, 1939.
Vouchers: W. L. Curtis and Eugene B. Ingmand.

TUCKERMAN, EDWIN D.

123 E. 4th St., Media, Pa.
V.M.D., University of Pennsylvania, 1928.
Vouchers: G. A. Dick and A. Henry Craige, Jr.

WARDEN, CLYDE EVERETT

Mount Hope, W. Va.
D.V.M., Cincinnati Veterinary College, 1917.
Vouchers: S. E. Hershey and C. C. Beall.

WIGHT, CHAS. H.

625 LaCadena Dr., Riverside, Calif.
D.V.M., Kansas City Veterinary College, 1916. Vouchers: W. L. Curtis and Eugene B. Ingmand.

WILDER, CLAUDE OTTO

Sylvania, Ga.
D.V.M., University of Georgia, 1933.
Vouchers: Clell B. Perkins and C. E. Cook.

WIFF, J. D. CONRAD

108 W. Lamme, Bozeman, Mont.
M.D.V., McKillip Veterinary College, 1909.
Vouchers: W. J. Butler and E. M. Jones-child.

ZURBRUGG, JOHN THOMAS

Bridgeboro Rd., Moorestown, N. J.
V.M.D., University of Pennsylvania, 1932.
Vouchers: R. A. Hendershott and J. R. Porteus.

Second Listing

Allen, Daniel B., 134 Spruce St. W., Sault Ste. Marie, Mich.

Ardito, Frank Anthony, 811 S. 10th St., Philadelphia, Pa.

Balke, Ernst J., Adams, Neb.

Bankowski, Raymond A., University of California, Berkeley, Calif.

Barrett, Lawrence F., Box 33, Cascade, Iowa.

Bearss, H. E., Minonk, Ill.

Black, Joe, Jr., 306 W. Houston, Marshall, Texas.

Bodine, Gwendolyn Gladys, 3549 Union Ave., Pennsauken, N. J.

Boucher, William Bishop, Millington, N. J.

Bowie, Dwain Taft, 511 New Federal Bldg., Atlanta, Ga.

Bridge, Roy Lewis, R. R. No. 2, North Manchester, Ind.

Brooks, Rex Howard, 3917 Brown St., Philadelphia, Pa.

Burkey, Fred M., 2507 Bissonet, Houston, Texas
Burleson, Benamin Z., 822 Washington Ave., Montgomery, Ala.

Burnette, Peter F., 362 Payne St., Auburn, Ala.

Coleman, Chas. L., 3054 Hollister Ave., Santa Barbara, Calif.

Conklin, Ralph Clifton, 511 Ojal Rd., Santa Paula, Calif.

Cook, Louis Philip, Box 291, Westwood Br. P. O. (Sta. L.), Cincinnati, Ohio.

Craig, Donald Bodine, Millstone, N. J.

De Groodt, James Hervey, E. Main St., Mendham, N. J.

De Tienne, Thais A., 210 S. Raymond, Pasadena, Calif.

Du Buy, Frank G., 53 Broadway, Freehold, N. J.

Dyches, Hutson Perry, 515 S. Boundary Ave., Aiken, S. Car.

Ecker, William R., 787 Clinton Ave., Newark, N. J.

Emminger, Albert Clarence, State Dept. of Agriculture, Division of Animal Industry, Sacramento, Calif.

Erdel, Fred J., 658 Burlington Ave., Frankfort, Ind.

Farnham, John Alden, East Windsor Hill, Conn.

Fields, Max, 4619 N. 10th St., Philadelphia, Pa.
Fine, Salem G., c/o Dr. A. L. Hirleman, 316 Water St., Augusta, Maine.

Fleck, George Jacob, 1400 Pottsville St., Pottsville, Pa.

Freel, Robert Gerard, 121 Orange St., Clinton, Mass.

Galphin, Samuel P., Holly Hill, S. Car.

Gardiner, Meredith Ryers, Jr., 123 County Line Rd., Bryn Mawr, Pa.

Gaul, Robert Carl, 29 N. Adams St., Pottstown, Pa.

Gerberich, Ammon Hauer, R. R. No. 1, Annville, Pa.

Graff, Carl, Bisbee, N. Dak.

Greenig, Charles Albert, 2830 Laclede Rd., Maplewood, Mo.

Griffel, Ralph H., Ackley, Iowa.

Griffin, Charles A., 375 Quail St., Albany, N. Y.

Halverson, Harry M., Flandreau, S. Dak.

Hand, Pearl Hugh, 656 Miller Ave., South San Francisco, Calif.

Harry, Roy Stephen, Dry Run, Pa.

Hartenstein, George Lewis, New Freedom, Pa.

Haynes, Wilford A., 110 W. Wilkins St., Jackson, Mich.

Heath, Bert Wesley, 812 S. Greenleaf Ave., Whittier, Calif.

Hilton, Howard Delbert, P. O. Box 832, Red Bluff, Calif.

Hoppenstedt, Gilbert Foster, Millar Animal Hospital, Deal, N. J.

Hughes, Walter Allen, 511 Water St., Charlottesville, Va.

Jenne, Herbert John, 1087 4th Ave., North Bergen, N. J.

Joslin, Eugene M., 429 N. Grand Ave., Fowlerville, Mich.

Kaplan, Martin Mark, 6103 N. 17th St., Philadelphia, Pa.

Keane, John J., 2 Cedar Ave., Bar Harbor, Me.
 Landis, James Scott, 238 W. 21st St., Norfolk, Va.
 McKay, John, Jr., 2326 W. 2nd St., Duluth, Minn.
 McKenzie, Wesley Augustus, Jensen Animal Hospital, Petoskey, Mich.
 Miller, Allen Jesse, 2209 Homewood St., Mobile, Ala.
 Parsons, Moss, 2130 P St., N. W., Washington, D. C.
 Persichetti, Karl, 2144 S. Broad St., Philadelphia, Pa.
 Presho, Russell Francis, 159 Morrissey Ave., Santa Cruz, Calif.
 Priest, Gerald Frederick, Deans, N. J.
 Roberts, Howard Franklin, 3591 Bancroft St., San Diego, Calif.
 Rosen, Joshua, 1571 Sheridan Ave., New York, N. Y.
 Schalm, Oscar William, 1423 Josephine St., Berkeley, Calif.
 Scham, Marvin H., Bay Ridge Rd., Annapolis, Md.
 Seeley, Milton James, P. O. Box 363, Lodi, Calif.
 Shellenberger, John Henry, Tannersville, Pa.
 Shepherd, Harry E., 1515 37th St., Sacramento, Calif.
 Simms, Robert, 312 Log Rd., Morristown, N. J.
 Sippel, William Lawrence, University of Pennsylvania, Philadelphia, Pa.
 Smart, E. G., 991 2nd St., Napa, Calif.
 Spielholz, Barney, 1480 Clinton Ave., Irvington, N. J.
 Stafford, Paul R., 934 Helen Ave., San Leandro, Calif.
 Stiern, Walter William, 1729½ Owen St., Station A, East Bakersfield, Calif.
 Sutherland, Richard Columbus, 1123 Truxtun Ave., Bakersfield, Calif.
 Taylor, James Kennerly, 45 Maryland Ave., Annapolis, Md.
 Thomas, William W., Merced, Calif.
 Turner, Clifford Wesley, 1538 Oakdale, Chico, Calif.
 Walbert, Benjamin Leon, Jr., 618 N. 6th St., Allentown, Pa.
 Winchester, Clarence L., Texarkana, Ark.
 Wortman, George Edward, Walden, N. Y.

13th Annual National Dog Week

More than 300 cities and communities will participate in the 13th annual observance of National Dog Week, September 22-28, sponsored by the National Dog Week Association. The educational program of the Association fights unjust dog laws, combats rabies scares and asks for better dog owners as well as better dog care. H. D. Bergman, past president of the AVMA, is a member of the honorary com-

mittee, of which Captain Will Judy, editor of *Dog World*, is general chairman.

In recent years the activities of the Association have been brought to the attention of over 50 million people through the press, radio, dog shows, parades and other community events. As a special project this year the Association is emphasizing that "every boy and girl should grow up with a dog as a lesson in obedience, kindness and responsibility."

U. S. GOVERNMENT

Regular Army

Major Stanley M. Nevin is relieved from assignment and duty at Barksdale Field, La., effective on or about August 1, 1940, is then assigned to duty at Camp Jackson, S. Car., and will proceed to that station and report for duty.

Announcement is made of the promotion of Captain Maurice W. Hale to the grade of major with rank from July 25, 1940.

Veterinary Corps Reserve

The following veterinary reserve officers have been ordered to extended active duty during the month of July and assigned to stations indicated:

1st Lt. Aaron F. Allison, Barksdale Field, La.
 1st Lt. James G. Anderson, New York Port of Embarkation, Brooklyn, N. Y.
 1st Lt. John M. Broadwell, Fort Bliss, Texas.
 1st Lt. Moray C. Coop, Fort Sill, Okla.
 1st Lt. Horace R. Collins, South Central Remount Area, Fort Worth, Texas.
 1st Lt. Lee Roy Chapman, Fort Bliss, Texas.
 1st Lt. William H. Dieterich, Camp Jackson, S. Car.
 1st Lt. Harry A. Gorman, Chicago Quartermaster Depot, Chicago, Ill.
 1st Lt. William R. Hulbush, Fort Lewis, Wash.
 1st Lt. Robert H. Hartman, Fort Sam Houston, Texas.
 1st Lt. Wendell Lee Kanawyer, Fort Bliss, Texas.
 Capt. Donald R. Morgan, Presidio of San Francisco, Calif.
 Capt. Arthur B. Rogers, Fort Bragg, N. Car.
 1st Lt. Edwin J. Smith, Chicago Quartermaster Depot, Chicago, Ill.
 Capt. Herbert F. Sibert, Fort Sill, Okla.
 Capt. William M. Thompson, North Central Remount Area, Kansas City, Mo.
 1st Lt. James Howard Watson, Fort Riley, Kan.
 1st Lt. Edward J. Watson, Presidio of Monterey, Calif.
 1st Lt. Charles J. Whitehead, Seattle Quartermaster Depot, Seattle, Wash.

1st. Lt. Walter Alvin Anderson, Veterinary Corps Reserve, is relieved from his present assignment and duty at Fort Lewis, Wash., effective on or about July 20, 1940, and will proceed to McChord Field, Wash., for duty.

1st Lt. Harry R. Lancaster, Veterinary Corps Reserve, is relieved from assignment and duty at Fort Sam Houston, Texas, on or about July 25, 1940, and will report to the commanding officer, San Antonio General Depot, San Antonio, Texas, for duty.

BAI Transfers

Henry J. Boyer from New York, N. Y., to Manchester, N. H., in charge of meat inspection.

Floyd E. Clark from Butte, Mont., to Reno, Nev., on meat inspection.

Meyer W. Cohen from New Haven, Conn., to Springfield Mass., in charge of meat inspection.

Danford L. Cos from Waterloo, Iowa, to Richmond, Va., on Bang's disease.

Aubrey B. Larsen from Lansing, Mich., to Atlanta, Ga., on Bang's disease.

Peter E. Madsen from Cheyenne, Wyo., to Salt Lake City, Utah, on Bang's disease.

David Marks from Detroit, Mich., to Wheeling, W. Va., on meat inspection.

Abraham Packer from Manchester, N. H., to New Haven, Conn., in charge of meat inspection.

Irvin T. Reed from Jacksonville, Fla., to Little Rock, Ark., on Bang's disease.

Samuel Stieber from South St. Paul, Minn., to New York, N. Y., on meat inspection.

Don R. Wilson from Lake Charles, La., to Fort Worth, Texas, on meat inspection.

Retirements.—Tilden A. Harrison, Richmond, Va.; Milton T. Perry, Springfield, Mass.

Civil Service Examination Announced

The U. S. Civil Service Commission has announced an open competitive examination to fill the position of research veterinarian (\$3,800 a year) in the Chemical Warfare Service, War Department, Edgewood Arsenal, Md.

Applications must be on file in the Commission's Washington, D. C., office not later than September 9, 1940, if received from states east of Colorado and not later than September 12, 1940, if received from Colorado and states westward.

Applicants must have completed a course leading to a degree in veterinary medicine in an accredited veterinary college and must have experience in animal-pathology research, and in practice, meat inspection or disease-control work.

Further information regarding the examina-

tion and the detailed requirements are given in the formal announcement. Announcements and application forms may be obtained from the secretary of the Board of U. S. Civil Service Examiners at any first- or second-class post office, or from the U. S. Civil Service Commission, Washington, D. C.

Concerning National Emergency

Acting jointly with the U. S. Civil Service Commission, the National Resources Planning Board is preparing a roster of scientific and specialized personnel for use in national emergency by request of President Roosevelt. The science division of the Board is represented by four councils, namely: Social Science Research Council, Council of Learned Societies, American Council of Education, and National Research Council. Within the latter is the Evaluation Committee in the Field of Clinical Medicine which is charged with aiding in the construction of the roster. This committee will consist of L. H. Weed, chairman, A. R. Dochez, H. D. Bergman and L. A. Merrillat. The committee will act under the direction of John S. Nicholas, professor of biology, Yale University, who has been named executive secretary of the National Roster Committee. The part of the work delegated to the National Research Council is directed by its chairman, Ross D. Harrison.

Farm Situation Looks Dismal

The Bureau of Agricultural Economics, U. S. Department of Agriculture, paints gloomy prospects on the farm situation. For the first six months of 1940, farm incomes were up about \$296,000,000 more than during the same period of 1939. European markets, however, which take one third of our farm products, are closed and there is no indication that they will open during the duration of the war. Though the cotton situation is particularly dismal, there is encouragement in the prospect of increased home needs by about a million bales.

Agricultural Research

During the past 40 years there has been a steady growth in funds and personnel allocated by federal and state governments for agricultural research. For the year 1939, slightly less than \$44,822,759 was expended and 9,954 persons employed.—*Daily Digest, USDA*, August 13, 1940.

The killing of 1,000 trees in and around Baltimore and some 7,000 in the neighborhood of Philadelphia and New Jersey by a new disease called "the London Plane blight" shows the potentiality of uncontrolled insect enemies. The disease is being studied by the USDA.

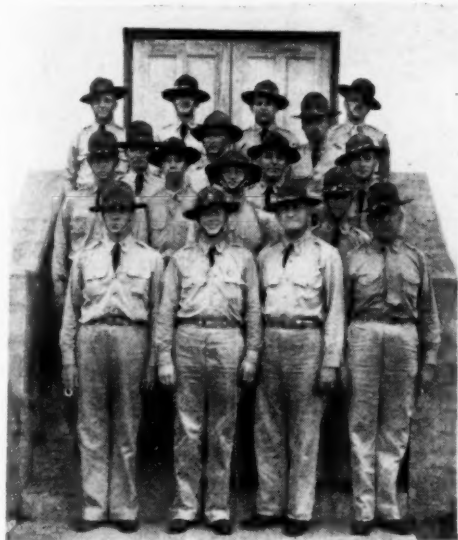
AMONG THE STATES

Alabama

On August 16, the following students were awarded the degree of Doctor of Veterinary Medicine by Alabama Polytechnic Institute: N. C. Baston, Northport, Ala.; J. H. Carter, Jr., Castleberry, Ala.; S. P. Galphin, Holly Hill, S. Car.; E. P. Hamner, Gordo, Ala.; O. E. Jung, East St. Louis, Ill.; T. E. Newton, Auburn, Ala.; and J. K. Taylor, Annapolis, Md.

Arkansas

Pictured below are some of the veterinarians who attended the two-week general unit training camp at Camp Joseph T. Robinson, Ark.,



Some of the veterinary reserve officers in attendance at Camp Joseph T. Robinson, Ark., July 14-27.

July 14-27. The membership of the camp comprised 200 reserve officers, including physicians, dentists and veterinarians.

Veterinary reserve officers attending the camp were Capt. E. I. Long of Wellington, Kan.; Capt. Duane L. Cady of Fort Snelling, Minn.; Lieut. L. E. St. Clair of Ames, Iowa; Lieut. C. W. Rippetoe of Fort Snelling, Minn.; Lieut. W. J. Price of Wisner, Neb.; Capt. C. L. Lash of St. Joseph, Mo.; Lieut. J. H. Watson of Fort Riley, Kan.; Capt. G. A. Kuhn of Des Moines, Iowa; Lieut. H. J. Conrad of Kansas City, Kan.; Lieut. K. S. Jones of Kansas City, Kan.; Major R. B. Meeks of Kansas City, Kan.; Lieut. S. S. Fisher of Little Rock, Ark.; Capt. H. L. Mor-

ison of Gilmore City, Iowa; Capt. R. L. Anderes of Kansas City, Mo.; Lieut. J. V. Shannon of South St. Paul, Minn.; Capt. M. L. Steele of Omaha, Neb.; Lt. Col. F. B. Croll of Kansas City, Kan.; Lieut. James R. Barry of Waterloo, Iowa; Lieut. James M. Cullison of Charleston, Mo.; Lieut. H. L. Geick of Waterloo, Iowa; Lieut. C. W. Gollehon of Omaha, Neb.; and Lieut. E. A. Murphy of Omaha, Neb.

Delaware

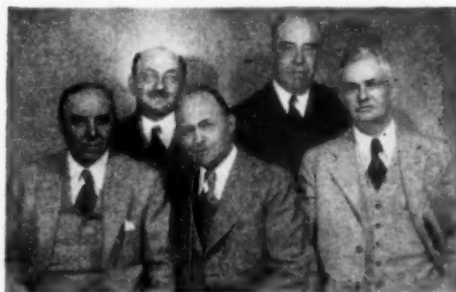
Harvey Fell of Wilmington, former secretary of the Delaware Veterinary Medical Association, invited members of the profession in Delaware to meet at the Hob Tea Room in Wilmington on July 30 for the purpose of reorganizing the state association, which has not held a meeting in several years. Nineteen veterinarians attended this session and, inasmuch as all present were eligible for membership, it was voted that those present would constitute the membership and that efforts would be made to induce all eligible men in the state to join.

Officers elected are H. P. Eves of Wilmington, president; C. C. Palmer of Newark, secretary-treasurer; and C. I. Hoch of Wilmington, M. L. Zurkow of Dover and J. R. West of Milford, board of directors.

C. C. PALMER, *Secretary.*

District of Columbia

The last class of the American Veterinary College in New York City was graduated in 1900 (entered 1897) and comprised the following five men: Charles E. C. Atkins, now of Bridgeport,



Left to right: Charles E. C. Atkins, Bridgeport, Conn.; A. Eichhorn, Beltsville, Md.; J. J. Hayes, Washington, D. C.; W. A. Young, Wausau, Wis.; and J. W. Fink, Central Valley, N. Y.

Conn.; A. Eichhorn, Beltsville, Md.; J. J. Hayes, Washington, D. C.; W. A. Young, Wausau, Wis.; and J. W. Fink, Central Valley, N. Y.

At the time of graduation these men agreed

to hold a reunion every ten years and a certificate simulating a diploma was engraved with the heading:

Roll Call Class 1900
A.V.C.
1910 1920 1930 1940

Each of the men has signed the certificates of the others at each decennial meeting. This year the reunion took place during the Washington session of the national association.

John R. Mohler, chief of the federal bureau of animal industry, has been chosen the Kober Lecturer for 1941, the executive board of the Medical Society of the District of Columbia recently announced.

The lecture and award will be given at Georgetown University, which is trustee for an endowment fund established by the late Dr. George M. Kober. The fund, among other things, provides for the recognition of outstanding scientists. Dr. Mohler has been asked to present a paper on undulant fever.

Florida

New among state association news letters is *The Florida Veterinarian*, a mimeographed pamphlet of eight pages. It is edited by V. L. Bruns of Williston, secretary of the Florida State Veterinary Medical Association.

Georgia

At the annual meeting of the Georgia State Veterinary Association, C. F. Davis of Thomasville was elected president; R. C. Fuller of Quitman, vice-president; and J. E. Severin of Atlanta, secretary (reelected).

Idaho

The Idaho Veterinary Medical Association held its summer meeting at Buhl, June 24-25. The veterinarians in all adjacent towns cooperated in furnishing clinical material. George R. Fowler of Iowa State College, Ames, Iowa, was in charge of the large animal clinic. H. E. Pinkerton of Fort Dodge, Iowa, spoke at the banquet and A. J. Fisk of Denver, Colo., showed motion pictures of improvements in dairy sanitation in and around Denver.

Philip Graves of Idaho Falls was elected president, and E. T. Powell of Boise, secretary-treasurer.

A. K. KUTTLER, *Resident Sec'y.*

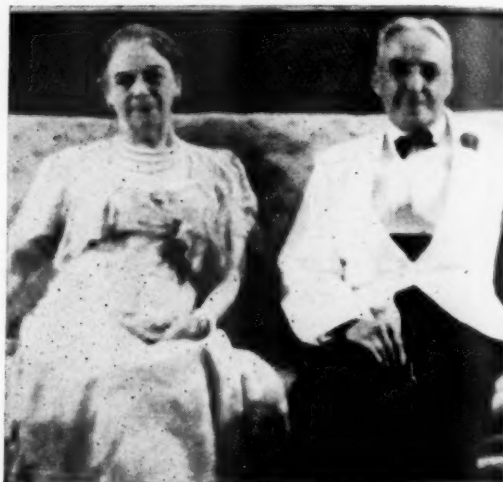
Illinois

The quarantine on dogs in force since March 14, 1940, in Rockford will not be lifted until there is evidence that such action would be "safe and satisfactory." State Veterinarian Rinehart recently ruled. There are many cases of rabies in the northern part of the state and

in the Rockford area, according to Dr. Rinehart.

Dr. and Mrs. W. C. Glenney of Elgin, Ill., were hosts to a gathering of Iowa State College veterinary alumni and their families on Sunday, August 11. Everyone enjoyed the party so much that it was decided to form a permanent organization. Preliminary plans were made for a 1941 meeting, L. A. Dykstra of Galesburg and Eugene B. Ingmand of Chicago being appointed co-chairmen of the event.

Friends and relatives of Dr. and Mrs. N. S. Mayo will long remember the *soirée* at the Moraine Hotel in Highland Park, July 30, on



—Cut courtesy Veterinary Magazine Corp.

Dr. and Mrs. N. S. Mayo

the occasion of the couple's golden anniversary. The event was a happy one, flowing with good cheer and spontaneous felicitations. Especially enjoyed was the honor of extending congratulations to a distinguished couple, prominent in important affairs of the country for many years. Mingling with the guests from the veterinary circle were Dr. and Mrs. D. M. Campbell, Dr. and Mrs. H. Preston Hoskins, Dr. and Mrs. Ashe Lockhart, Dr. and Mrs. L. A. Merillat, and Col. and Mrs. H. E. Van Tuyl.

It is not generally known that J. W. Lucas, president of the Illinois State Veterinary Medical Association, is a brother of Senator Scott Lucas, senior U. S. senator from Illinois who is known for his sound reasoning in the handling of the big issues of the nation.

In a circular letter to the veterinarians of the state, President Lucas of the state association draws attention to the revision of the veterinary set-up by the 1941 legislature which will

be presented for enactment into a law after consultations with all interests concerned: department of agriculture of the state university, state department of agriculture, state department of health, extension service and civil livestock and farm organizations. A committee of the state association is charged with bringing these interests into conference and framing a measure that will meet general approval.

Indiana

Hakon Holm (Ont. '38) has reported that two diplomas from the Ontario Veterinary College, a membership certificate of the science association of that school and an Indiana license were stolen from his room in Bourbon, Ind., on July 11, presumably by a suspect whom he describes as follows: The man introduced himself as "Dr. Isebell" of Morristown, Tenn., appears about 40 years of age, has straight black hair parted to the right with streaks of gray, is 6 ft. tall and weighs about 225 lb. On his left hand he wore a Masonic ring. He has a pronounced southern accent. He drove a black 1940 standard Ford coupe bearing a Tennessee license, and he carried an assortment of veterinary equipment and instruments in the car. At the rooming house where he stayed July 6, he signed his name "C. M. Jelmson," as closely as can be determined from the signature, which was written with the left hand. He said that he is a graduate of Alabama Polytechnic Institute, class of '24, and that Alabama is his home state. He claimed that he was on a vacation and that a nephew who graduated from veterinary college two years ago was taking care of his practice.

Anyone able to furnish information as to the whereabouts of this person should write to Dr. Hakon Holm, Bourbon, Ind., or to Dr. J. L. Axby, Room 209 State House, Indianapolis, Ind.

Iowa

Iowa veterinarians who play golf will gather at Ames for a "Veterinary Golfers' Day" on September 10. Competitive play will start promptly at 10:00 a. m. In the evening a stag party will be held. K. W. Schalk of Iowa is chairman of the committee in charge.

The program committee of the Central Iowa association, a group that holds monthly meetings at Des Moines, announces that its schedule is now complete for a full year of sessions beginning this month. The committee is composed of George R. Fowler of Ames, chairman, Clyde Franks of Grimes and A. H. Quin of Des Moines.

Emphasis will be placed on discussions of general-interest subjects outside of strictly professional activity and will include talks by authorities on jurisprudence, agricultural and livestock economics, and nutrition. In addition

a program will be presented at each meeting by practitioners of county units on a variety of seasonal topics.

Robert D. Wall of Des Moines is secretary of the group.

Massachusetts

The first fatality this year from equine encephalomyelitis among horses of the state was reported on July 23 by Harrie W. Peirce, chief veterinary health officer of the state division of livestock disease control.

In 1938, when equine encephalomyelitis first broke out in Massachusetts, 300 horses died as the result of it. Last year only 13 cases were reported, of which five were fatal.

Four cases of the disease have been reported thus far this year to the division of livestock disease control. Of these, one horse in Worcester county died, another horse in Essex county recovered, and the two remaining cases, one in Worcester county and the other in Hampshire county, are under treatment. None of the four animals was vaccinated.

Missouri

E. D. Criswell (Western '04) of King City reports a case of equine encephalomyelitis, "the worst I have had this year," in a valuable horse on a farm near King City.

A new committee was recently appointed by C. T. Old, president of the Missouri Veterinary Medical Association. This unit is known as the "Stimulation Committee" and its membership comprises the secretary of each of the eight sectional associations in the state. By virtue of their close contact with veterinary activities in their respective sections, these men are strategically situated to figure prominently in the success of both the local and the state associations.

J. L. WELLS, *Secretary.*

R. G. Green, professor of bacteriology at the University of Minnesota medical school, Minneapolis, Minn., was guest speaker at the August meeting of the St. Louis District Veterinary Medical Association. He spoke on "The Nature of Virus Diseases."

Montana

The laboratories of the Montana Livestock Sanitary Board ran saliva tests on race horses during the past racing season. In many of the tests conducted they found no evidence of the use of narcotics to stimulate the animals.

W. J. BUTLER, *Resident Sec'y.*

State meat inspection is being sought at Kalispell by the Pomona Grange of Flathead county. The Grange has asked that the state livestock sanitary board, headed by W. J. Butler of

Helena, provide inspection of beef, mutton and pork. Poultry inspection is adequate at present.

The Kalispell action came after the Montana state association recommended at its annual meeting in Bozeman, June 28-29, that meat inspection should be established "wherever such inspection is practical and is desired by the community."

New Hampshire

R. W. Smith of Concord has been elected delegate to the House of Representatives of the national association, and G. W. Holmberg of Nashua, alternate.

New Jersey

The New Jersey legislature recently passed, and the governor approved, a special bill appropriating money to pay indemnity to the owners of nine animals which were destroyed because of being affected with rabies.

J. R. PORTEUS, *Resident Sec'y.*

New York

The Gastrointestinal Service of the Memorial Hospital for Cancer and Allied Diseases in New York City, in carrying out a study of the incidence of cancer of the stomach in lower animals and fowls, needs gross and microscopic specimens of such cancers and is appealing to veterinarians for aid in securing them. They will, if requested, render reports to contributors on the pathology of the tumors submitted.

Veterinarians who are in position to aid in this project should communicate with George T. Pack, M.D., 155 E. 72nd St., New York, N. Y.

When the meat-packing industry discovered that pumping brine into the center of meat cuts insures through and through and more rapid curing, it set a bad example to "chiseling" meat dealers. The measure led to the pumping of large amounts of water to increase weight of market meat. The cheating has become such a widespread racket in New York City that a special law was passed in the hope of correcting the evil. The law did not work and the cheating goes on. It is more profitable to pay the small fines assessed against violators than to desist, experience of the city department of health has shown. What is a fine of \$25.00 or so once in a while against the millions of profits made from the cheating?

Investigations made by *PM*, New York's famous "no advertisements" newspaper, show that tremendous quantities of meat sold in that city are increased from 40 to 60 per cent in weight by pumping in water and that the fraud has developed a million-dollar industry that thrives by defrauding the public of millions of dollars annually. The organization of a

fearless meat-inspection service sufficiently deployed has been suggested as a means of stopping this greatest of fraudulent practices in the history of American business enterprises.

North Carolina

As of August 12, equine encephalomyelitis has not been prevalent in North Carolina during 1940. Very few cases have been reported and, with the exception of four or five places in the state, vaccination has not been practiced. The disease, in fact, has never been a major problem in the state.

J. H. BROWN, *Resident Sec'y.*

The Roanoke Tar Veterinary Medical Association, a local group in northeastern North Carolina, met at Panacea Springs on July 10, with twelve veterinarians and their wives in attendance. Following a picnic dinner, the men engaged in a discussion of timely veterinary topics.

North Dakota

Approximately 60 veterinarians attended the 36th annual meeting of the North Dakota Veterinary Association, held in Fargo, June 24-25.

A business session, literary program, luncheon and dinner-dance in the Town Hall of the Hotel Gardner constituted the activities of the first day. On the morning of June 25, a clinic was held on the North Dakota Agricultural College campus, E. F. Waller and M. J. Johnson, both of Iowa State College, Ames, Iowa, officiating as clinicians.

The Fargo chamber of commerce gave a picnic lunch for the veterinarians and their families at noon on the campus.

R. E. Krieger of Williston, vice-president, was nominated for the presidency, but declined. S. S. Westgate of Grafton was then elected president and R. W. Bernhardt of Enderlin, vice-president. M. C. Hawn was reelected secretary-treasurer.

F. M. BOLIN, *Reporter.*

Oklahoma

Oklahoma has had excessively hot weather this summer, but in general the crops are good. Live stock is in favorable condition, but there has been a widespread outbreak of equine encephalomyelitis causing many fatalities, with more colts and young stock affected than usual. Although considerable vaccination has been done, more is needed.

The state needs veterinary practitioners and offers several locations where a substantial practice could be built in a short time.

S. E. DOUGLAS, *Resident Sec'y.*

Ontario

Steps have been taken by the Ontario Veterinary Medical Association to cooperate with the

National Veterinary Medical Association of Great Britain in caring for children sent to Canada under stress of the war.

Pennsylvania

A bicentennial conference will be held by the University of Pennsylvania, Philadelphia, September 16-20, as part of the program marking the observance of the 200th anniversary of the University's origin.

The program of the conference will consist of lectures and papers by a group of distinguished American and European scholars and leaders in the fields of science and social science.

A symposium on "The Relation of Animal Diseases to Human Welfare" will be held on Thursday morning, September 19, with the following veterinarians participating: John R. Mohler, chief, Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C., "The Relationship of Animal Diseases to Human Welfare"; Colonel R. A. Kelser, chief, Army Veterinary Corps, Washington, D. C., "Veterinary Research and Public Health"; and Cassius Way, New York, N. Y., immediate past president of the American Veterinary Medical Association, "Veterinary Medicine and Progress."

• • •

The Del-High Veterinary Club held a meeting on July 26 at Allentown, with 14 members in attendance. J. E. Gregory served as chairman of the meeting and Sherman Ames of Easton, secretary. Dr. Ames was reelected to the secretaryship for the next meeting, to be held at the farm of E. J. Balliet in Northampton, September 10. Dr. Balliet will preside at the meeting. An old-fashioned clam bake is planned as the social feature.

SHERMAN AMES, *Secretary.*

Saskatchewan

The 32nd annual meeting of the Veterinary Association of Saskatchewan was held at the University of Saskatchewan in Saskatoon, August 3. Members from all parts of the province were present.

One of the major issues discussed was the discontinuance of part-time work done by private practitioners for the Health of Animals Division of the Dominion Department of Agriculture. This work was stopped because the funds formerly appropriated had to be diverted to wartime emergency projects. It was the consensus that the energetic prosecution of the war hazards comes first, but that the elimination of tuberculosis in cattle—the federal work in which the private practitioners were engaged—should be resumed as soon as funds are available. The fact that the number of new cases of tuberculosis in children and young people decreased markedly where the milk supply was from tuberculosis-free cattle is of sufficient im-

portance, it was declared, to justify the reestablishment of the project at the earliest possible date.

J. L. Millar spoke on deficiency diseases of cattle and D. W. McDonald spoke on poultry diseases.

Election of officers and members of the council resulted as follows: A. Chambers of Regina, president; L. L. Hewitt of Regina, vice-president; Norman Wright of Saskatoon, registrar; and J. S. Fulton of Saskatoon, D. W. McDonald of Moose Jaw, L. D. Millar of Asquith and H. Richards of Indian Head, members of the council.

NORMAN WRIGHT, *Registrar.*

South Dakota

The picture of "the veterinary family" shown below was submitted by a reader in South Dakota. Shown in front is O. D. Chedester (McK. '10), who has been in general practice at



"The veterinary family."

Cordell, Okla., for 30 years. In the back (left to right) are C. J. Price (K.S.C. '31), son-in-law of Dr. Chedester and an employé of the federal bureau of animal industry at Sioux Falls; and two sons, L. D. Chedester (Tex. '40), now at Cordell, Okla., and Ernest M. Chedester, a third-year veterinary student at Texas A & M College.

Tennessee

According to State Veterinarian A. C. Topmiller, during the month of July there were 10 outbreaks of hog cholera in 8 counties of the state, 18 outbreaks of erysipelas in 10 counties, 3 outbreaks of hemorrhagic septicemia in 3 counties, 3 outbreaks of blackleg in 3 counties, and 1 outbreak of anthrax.

Texas

The East Texas Veterinary Medical Society has presented a resolution for consideration by other local associations of the state as regards violations of the veterinary practice act. It is proposed that a reward of not less than \$50 be offered for the arrest and conviction of any person violating the practice act on or after July 11, 1940. In the event of convictions, each

of the five local associations of the state would be asked to contribute \$10, in order to make up the amount of the reward.

Utah

D. E. Madsen of the Utah Agricultural Experiment Station at Logan addressed Utah dairymen during their Dairy Day meeting, held on August 1 at the Utah State Agricultural College. Dr. Madsen presented various aspects of Bang's disease control and vaccination and concluded with a review of hemoglobinuria, which is prevalent in some districts of the state during winter months.

E. D. LEIBY, *Resident Sec'y.*

Wisconsin

The tenth annual convention of the Biological Photographic Association will be held at the Hotel Schroeder in Milwaukee, September 12-14. The membership of the Association comprises professional clinical and biological photographers as well as veterinarians, physicians, dentists and other scientists who are interested in this type of photography.

Further information may be secured by writing to the secretary of the Biological Photographic Association, University Office, Magee Hospital, Pittsburgh, Pa.

• • •
The second annual clinic and business meeting of the South Western Wisconsin Veterinary Medical Association was held at Fennimore, August 8.

Election of officers preceded a luncheon and the following men were chosen to serve for the ensuing year: R. B. Hipenbecker of Fennimore, president; R. A. Ogilvie of Mt. Horeb, first vice-president; B. L. Lawlor of Shullsburg, second vice-president; C. W. Burch of Platteville, secretary; and J. O. Schimming of Mineral Point, treasurer.

Short talks were given by J. S. Healy of Madison and Senator Edward Roethe of Fennimore. The afternoon was devoted to clinical demonstrations and surgical operations. In view of the fact that the southwestern group is a new organization—a regional group—they are to be complimented upon the fine clinic they staged.

J. S. HEALY, *Resident Sec'y.*



One of the many places of interest visited by members of the AVMA during the Washington convention, August 26-30, is the Treasury building, shown above.

COMING MEETINGS

- Small Animal Hospital Association. Los Angeles, Calif. September 3, 1940. W. K. Riddell, secretary, 3233 W. Florence Ave., Los Angeles, Calif.
- New York City, Veterinary Medical Association of. Hotel New Yorker, New York, N. Y. September 4, 1940. J. J. Merenda, secretary, 136 W. 53rd St., New York, N. Y.
- Dallas-Fort Worth Veterinary Medical Society. Fort Worth, Texas. September 5, 1940. R. L. Rogers, Jr., secretary, Route 2, Gordon, Texas.
- St. Louis District Veterinary Medical Association. 7800 Olive St. Rd., St. Louis, Mo. September 6, 1940. J. P. Torrey, secretary, 555 N. 14th St., East St. Louis, Ill.
- Ak-Sar-Ben Veterinary Medical Association. Fontenelle Hotel, Omaha, Neb. September 9, 1940. J. D. Ray, secretary, 1124 Harney St., Omaha, Neb.
- Chicago Veterinary Medical Association. Hotel Sherman, Chicago, Ill. September 10, 1940. G. S. Elwood, secretary, 5449 Broadway, Chicago, Ill.
- Del-High Veterinary Club. Northampton, Pa. (at the farm of Dr. E. J. Balliet). September 10, 1940. Sherman Ames, secretary, 129 Spring Garden St., Easton, Pa.
- Kansas City Veterinary Medical Association. Kansas City, Mo. September 16, 1940. S. J. Schilling, secretary, Box 167, Kansas City, Mo.
- San Diego County Veterinary Medical Association. Zoological Research Bldg., Balboa Park, San Diego, Calif. September 16, 1940. Paul D. DeLay, secretary, State Poultry Pathological Laboratory, Balboa Park, San Diego, Calif.
- Southern California Veterinary Medical Association. Chamber of Commerce Bldg., Los Angeles, Calif. September 18, 1940. Charles Eastman, secretary, 725 Vancouver Ave., Los Angeles, Calif.
- South Alabama-West Florida Veterinary Medical Association. San Carlos Hotel, Pensacola, Fla. September 27, 1940. E. M. Nighbert, secretary, Route 1, Box 118, Cantonment, Fla.
- Eastern Iowa Veterinary Association, Inc. Hotel Montrose, Cedar Rapids, Iowa. October 15-16, 1940. H. E. Tyner, secretary, New London, Iowa.
- Purdue University Short Course for Veterinarians. Purdue University, Lafayette, Ind. October 16-18, 1940. C. R. Donham, chief veterinarian, Purdue University, Lafayette, Ind.
- Interstate Veterinary Medical Association. Hotel Warrior, Sioux City, Iowa. October 17-18, 1940. Boyce G. Reid, secretary, Sioux City, Iowa.
- Twenty-First Annual Veterinary Conference, University of Illinois. Urbana, Ill. October 22-23, 1940. Robert Graham, chief, Division of Animal Pathology and Hygiene, University of Illinois, Urbana, Ill.
- Florida State Veterinary Medical Association. West Palm Beach, Fla. October 28-29, 1940. V. L. Bruns, secretary, Williston, Fla.

PERSONAL NOTES

- James A. McOwen (O. S. U. '40) has located at Sunbury, Ohio, for practice.
- Orin E. Ellis (K. S. C. '40) has located for general practice at Paris, Mo.
- Phil J. Pfarr (Wash. '40) has established an office at Riverside, Ore.
- A. Rex Puterbaugh (Iowa '40) has accepted a position with Harry Caldwell (Chi. '05) of Wheaton, Ill.
- R. J. Dundas (Iowa '40) has opened an office in Bloomfield, Iowa, and will conduct a general practice in Davis county.
- Clarence A. Jordan (Corn. '40) of Catskill, N. Y., is now associated with Leon L. Parker (Corn. '10) as an assistant.
- Morgan K. Jarvis (K. S. C. '40) is associated

in practice with H. R. Groome (K. S. C. '07) at Twin Falls, Idaho.

H. Loughridge (K. S. C. '39) is now associated with J. A. Jensen (McK. '16), general practitioner of Marshalltown, Iowa.

The wife of J. H. Burt (O. S. U. '05) died suddenly on June 3, 1940, as a result of an acute attack of coronary thrombosis.

Robert Fisher (Iowa '40) has purchased the practice of A. L. Craik of Ireton, Iowa, who was recently forced to retire on account of ill health.

Harold O. Peterson (Wash. '36), in charge of the Washington state department of agriculture laboratory, has resigned to accept a position with the BAI in Idaho.

M. O. Barnes (Wash. '27) of the federal bureau of animal industry, Olympia, Wash., is the new secretary of the Washington State Veterinary Medical Association.

L. G. Nicholson (Wash. '37), state veterinary inspector, has resigned to accept the position of research veterinarian on poultry diseases at the State College of Washington.

Lawrence O. Mott (K. S. C. '29) of the pathological division, federal bureau of animal industry, Washington, D. C., has been promoted to assistant to the senior veterinarian.

Dale Yokum (K. S. C. '40) has located at Iola, Kan., where he has remodeled a five-room building to serve as an animal hospital and office.

William H. Dreher (Iowa '40) has located at Oregon, Wis., for practice. Dr. Dreher's father practiced in Oregon prior to his death three years ago.

Mark Crandall (Corn. '39), formerly associated with an artificial insemination project sponsored by Cornell University, has established an animal hospital and kennels at Gloversville, N. Y.

E. M. Harris (Wash. '39), formerly associated with J. L. Gibbons (Iowa '36) of Chehalis, Wash., has purchased the veterinary hospital and practice of Mervyn D. McKenzie (Wash. '39) at South Bend, Wash. The latter has accepted a position with S. S. Worley (Wash. '22), who is located at Bellingham, Wash.

W. J. Embree (Chi. '10), who is associated with the agricultural relations department of the New York Central Railroad, director of the National Livestock Loss Prevention Board and secretary of the Livestock Loss Prevention Association of Ohio, has been elected president of the General Orton chapter of the reserve officers' association of Columbus, Ohio. The General Orton unit is the third largest chapter of the association in the country.

DEATHS

Theo. Schondau of Halethorpe, Md., died on May 6, 1939.

Born at Columbia, S. Car., July 2, 1879, Dr. Schondau was graduated from the U. S. College of Veterinary Surgeons in 1910. He joined the national association in 1918.

John K. Ditto of Eminence, Ky., a graduate of the Cincinnati Veterinary College, class of '10, and a member of the AVMA since 1912 died in May of 1940.

R. W. Butterworth of Paterson, N. J., died on July 27, 1940, from carcinoma of the throat.

Born at Paterson, N. J., May 19, 1884, Dr. Butterworth was graduated from the New York-American Veterinary College in 1907. Immediately after graduation he entered general practice at Paterson, where he continued until the time of his death. Dr. Butterworth joined the national association in 1920.

Thos M. Shepherd of Stone Bluff, Iowa, died on July 19, 1940.

Frank D. Monell of Derby, Conn., a graduate of the Ontario Veterinary College, class of '03, died on June 29, 1940.

Richard D. Van Aken of Columbus, Wis., a graduate of the Chicago Veterinary College, class of '93, died on April 30, 1940.

Charles L. White of Pasadena, Calif., a graduate of the Kansas City Veterinary College, class of '11, died on July 1, 1940.

John N. Wittpenn of Newark, N. J., a graduate of the American Veterinary College, class of '90, died on June 6, 1940.

Charles O. Collins of West Leesport, Pa., a graduate of the Ontario Veterinary College, class of '87, died on June 25, 1940.

R. A. Pickett of St. Paul, Minn., a graduate of the Kansas City Veterinary College, class of '15, died on June 9, 1940.

Earl Van Buskirk of Eldon, Iowa, a graduate of Iowa State College, class of '18, died in June of 1940.

William L. Clark, of Seneca Falls, N. Y., a graduate of Cornell University, class of '07, died on March 21, 1940.

Clair O. Joslyn of Snyder, N. Y., a graduate of Cornell University, class of '30, died on April 7, 1940.

Earl C. Rhodes of Sexton, Pa., died on July 12, 1940.

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Animals That Make the News

Oklahoma Veterinarian
a Successful Karakul Fur-Sheep Farmer

George N. Russel, Guthrie, Okla., veterinarian, is a "fur-coat pioneer." He doesn't sell fur coats, he raises the materials for them—and such rare ones as Caracul, the more expensive Persian lamb, and the cream

of the fur-sheep crop, Broadtail. The trade name for his Karakuls is "Diamond R."



George N. Russel

At the present time the number of actual breeders of Karakul fur sheep in the United States is about 500. An official inspection of pure-breds was made in 1930 by the U. S. Department of Agriculture, which disclosed that there

were about 1,600 so-called purebreds and, in addition, a large number of high grades, indicating a healthy foundation on which to build a national industry.

The natural habitat of the animals is Bokhara, a desert province of Asia Minor. The Bokharian Karakul sheep is one of the broad-tailed sheep which in many variations are extended over the regions of Central Asia, Iran, Caucasus, Mesopotamia, and down into Africa. However, the tight curl-producing variety, the Karakul, is a native of a proportionately small region, the former Chanat of Bokhara. The exact origin is unknown, but it dates back into antiquity. The first authentic records as to the production of valuable lamb skins in Bokhara appeared in 978 B. C.

Karakuls prefer areas of tropical temperature with low rainfall. The great sheep-raising areas of the mountain and desert

(Continued on page xviii)

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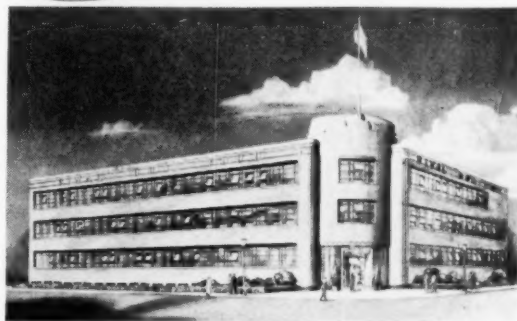


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Animals That Make the News

(Continued from page xvi)

regions of the United States are climatically suited to the raising of this breed, with the result that American breeders have achieved marked success with imported stock and are producing a superior quality of fur. In fact, the failures on record have in most cases been brought about by bad breeding rather than by unfavorable climate.

Much credit is due the late Alex Albright of Dundee, Texas, for his untiring efforts



Rams on the Russel farm.

in developing the Karakul fur-sheep industry in the United States. He has been called the "dean of Karakul breeders." The first importation into the United States was in 1908. The animals were sent to a farm in Texas, there interbred and crossed with domestic breeds.

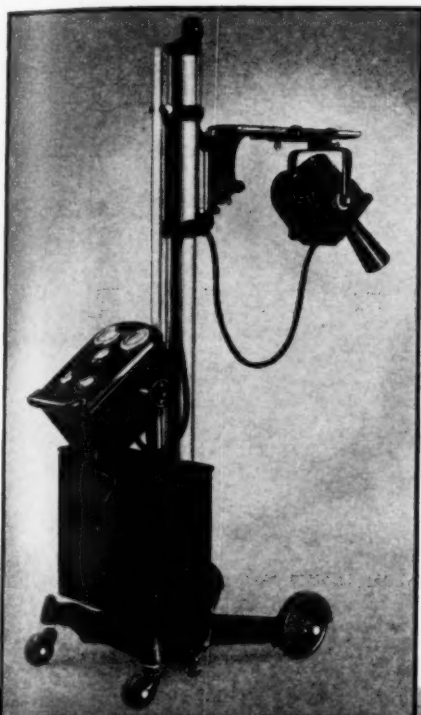
Exports of Karakuls have now been made from the United States to South American countries, Japan, Norway and many others.

Dr. Russel has 41 purebred sheep, also 33 sheep one half to three fourths full blood. These animals, if bred with purebreds, produce the same quality of fur as two full-blood Karakuls. A lamb born recently on his farm sold for \$75, an example of the high prices which quality animals bring. The original animals for his flock were purchased from the Alex Albright farm at Dundee, Texas, where 1,000 purebred Karakuls are farmed. Mrs. Albright continues the same principles of developing superior breeding stock as used by her husband.

Dr. Russel was graduated from the Kansas City Veterinary College in 1911 and practiced in Jefferson and Douglas counties,

(Continued on page xx)

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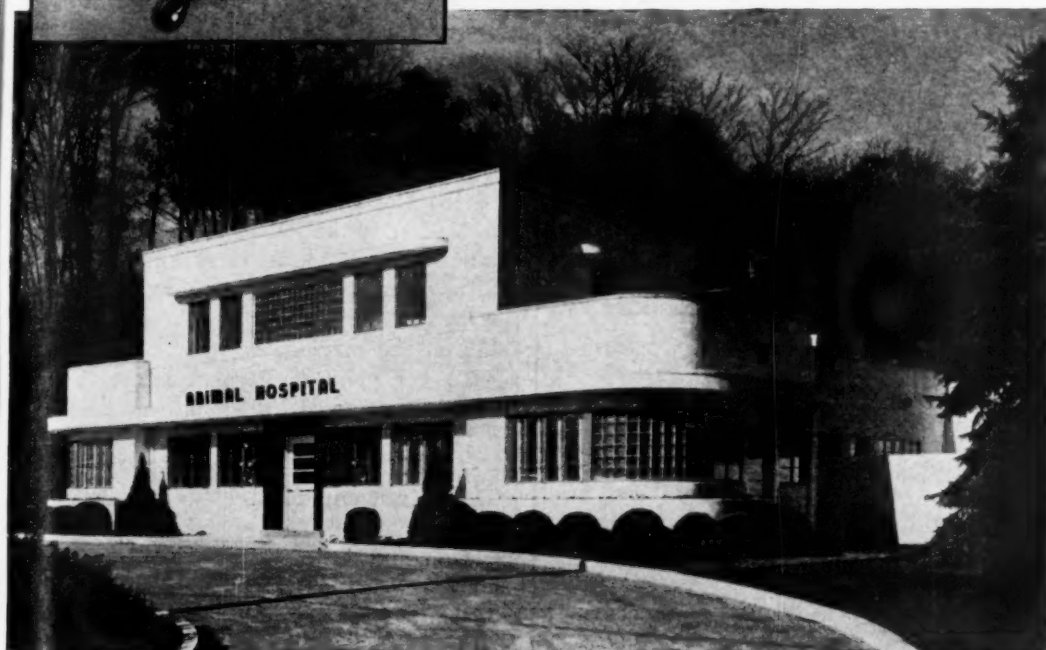
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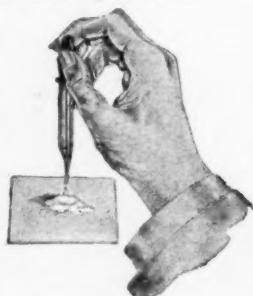


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Animals That Make the News

(Continued from page xviii)

Kan. In 1934, he entered the service of the federal bureau of animal industry in Kansas, and in 1935, was transferred to Oklahoma, where he did Bang's disease-eradication work until 1939, when he again went into private practice, opening an office in Guthrie.

It is Dr. Russel's intention eventually to move to his farm, which is located near Seward, Okla., one of only three such farms in the state, to devote all of his time to



Mrs. Russel with two 5-month-old lambs.

developing a flock of purebred Karakuls for the production of high-class breeding stock as well as Persian lamb skins and a flock of grades for the production of pelts, as is being done by other breeders.

Here is the manner in which the three types of Karakul fur are obtained: To get Broadtail, which is flat, wavy and velvet-like to the touch, on very thin leather, a baby Karakul must be skinned before it is born, either by killing the ewe, by abortion or by premature birth. The pelts average \$30 on the market.

To get genuine Persian lamb, the baby Karakul must be killed and skinned while it is 1 to 3 days old. The pelts bring from \$5 to \$25, but the average is \$10. This fur has a tight curl on light-weight leather.

For Caracul fur, which has a heavier leather and loose, wavy curls of 1/2 to 3/4 in. long, the lamb must be killed while it is 5 days to 2 weeks old, the pelts bringing from \$1.50 to \$5 each.

After the animals pass the Caracul fur

(Continued on page xxii)



*Injecting the first "diphtheria horse"
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The young doctor who called on Von Behring

The year—1894. Treatment of diphtheria was largely a matter of topical applications to the throat, and "watchful waiting." Then came the news of von Behring's discovery of diphtheria antitoxin.

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Animals That Make the News

(Continued from page xx)

stage, their fur becomes long and shaggy. It is sheared and marketed as wool, which sells for only slightly less than the regular white wool.

Because of Dr. Russel's excellent back-
ground in the field, together with the pro-
found interest of both Dr. and Mrs. Russel
(who were married May 16, 1940) in this
enterprise, "Animals That Make the News"
predicts a brilliant future for them in pio-
neering the Karakul industry in Oklahoma.

Holland to Kill Hens Because of Chicken-Feed Shortage

Nearly 12 million of the 18 million laying
hens in the Netherlands will be slaughtered
before September 15 due to a shortage of
chicken feed.

New Englanders' Telephones Buzz—Literally

Investigating complaints of interrupted
service by telephone users in Newington,
Conn., a lineman found that a swarm of
bees had started a honeycomb in the control
box.

Japan Uses Skins of Dogs, Cats and Chickens to Meet Cowhide Shortage

An acute shortage of cow hides in Japan
is being met by the substitution of dog, cat
and even chicken skins, according to a re-
cent report of the U. S. Department of Com-
merce. In Osaka a dog-leather trade asso-
ciation has been organized for the purpose
of allying activities in this new industry
and controlling prices, which have soared
to unprecedented heights.

War-Zone Refugee Smuggles Dog to America

How a war-zone refugee smuggled his
tiny Maltese dog to America was told to
Chicago newspaper reporters recently.

The owner, Norman P. Stevenson of Chi-
cago, said that he brought the dog with
him on the Spanish freighter, Mar Canta-
brico. The boat sailed on June 29 from

(Continued on page xxiv)



The Test of the Pudding . . .

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WOMAN veterinarian, Cornell '39, single. New York state license; considerable practical experience in small animal clinics. Opportunity wanted to assist and practice in established clinic. Able to assume responsibilities. Address: "BE," c/o Journal of the AVMA, 600 S. Michigan Ave., Chicago, Ill.

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ASSISTANT for position of resident veterinarian; single; room in hospital but no board. Write giving full particulars, including year of graduation and references. Dr. Alexander Slawson, 2414 Amsterdam Ave., New York, N. Y.

WILL PAY CASH for mixed or small animal practice, any state. Dr. Bey, c/o F. V. Kniest, 1537 S. 29th St., Omaha, Neb.



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Animals That Make the News

(Continued from page xxii)

Barcelona and for 17 days Stevenson secretly fed and watered the animal, keeping it in a perforated handbag until he landed in New Orleans, La.

Stevenson said that the dog, probably the only animal to be brought from the war zone on a refugee boat, saved his life in more than one instance while in France by barking at the first sensation of approaching aircraft.

Dog Drenches Self to Revive Heat-Stricken Owner

Edward Rowe, a farmer of Rockville, Ind., was overcome by heat while driving a cow to pasture a short time ago. His dog, apparently perceiving the trouble, ran to a nearby creek, jumped in and rushed back to shake water on him.

Crazy Mountains of Montana to Get Herd of Mountain Goats

A number of mountain goats, now roaming the Flathead National Forest of northwestern Montana, will be transported via airplane to the Crazy Mountains of Montana, there turned loose to start a new herd in that picturesque wilderness.

The problem of catching these wild creatures has been assigned to a dude rancher, who plans to use live traps.

Estes Park Has 1,800 Horses Available for Summer Visitors

Summer visitors who wish to ride horseback through the scenic areas of Rocky Mountain National Park may make their choice of mounts from 1,800 horses the park has on hand for that purpose.

African Police Dogs Help Solve Intricate Crimes

Thrilling stories of the exploits of police dogs in the detection of crime are told in the annual report of the South African commissioner of police, Col. I. U. de Villiers, according to a recent United Press report.

In one case a dog aided in the capture of

(Continued on page xxvi)

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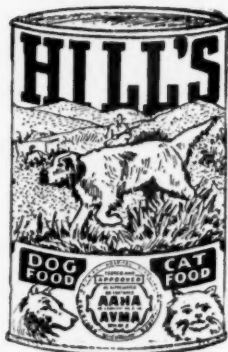
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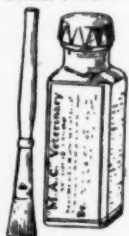
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Animals That Make the News

(Continued from page xxiv)

a thief who subsequently admitted that he had wrapped his feet in sacking to escape detection. On another occasion a dog followed a trail 1½ miles to a hut in the middle of a group of 38 huts with 135 inhabitants and singled out the native wanted.

The only naturally tailless dog is the Schipperke Poodle, a breed developed in Holland and Belgium.

Without, however, explaining how the census was taken, a statistician places the number of songbirds in the United States at 3 billion.

The man who buys a dog assumes a public responsibility just as he does when he buys an automobile. . . . Proper care of a dog takes time and trouble. If the dog itself is not compensation for this trouble, don't buy one.—*From Our Dumb Animals.*

The katydid is a close relation to the cockroach, grasshopper and cricket. It makes its music by scraping one wing upon a ridge on the other, and with such perfect tempo that the music of a dozen may seem as one.

The toughest problem the veterinary profession has to solve is the indifference so many of its members manifest toward the details of organized effort.

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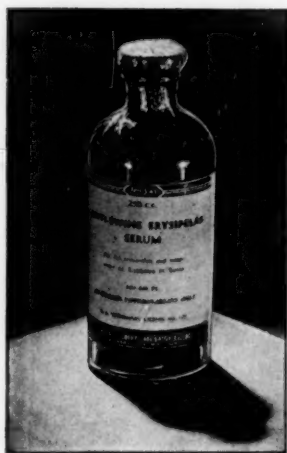
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